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ABSTRACT

These seven presentations cover various aspects of career development and employment of the visually impaired. "Career Development Theory Applied to the Delivery of Services to Blind and Visually Impaired Persons" (William H. Graves) describes the Career Development Intervention Strategy model developed by the Rehabilitation Research and Training Center on Blindness and Low Vision. "Career Development in an Educational Context" (Susan Jay Spungin) discusses career education goals and objectives, career educational models, and the status of career development. "Career Planning for the 1980s and 1990s" (James Kesteloot) considers these areas of concern: planning for the future, six steps in career planning, and the RTLT method (resume, telephone call, letter, telephone call) of finding employment. Three workshop presentations follow. "Vocational Assessment for Visually Impaired Persons" (J. Michael Peterson) describes three projects at Mississippi State University intended to improve vocational assessment services. "Job Site Modifications Utilizing Color and Light" (Martha Pagley) presents results of illumination and color studies and lists low vision modifications using color and light. "Industrial Services Programs (ISPs): A New Route to Jobs in the Private Sector for Blind and Severely Visually Impaired Workers" (William H. Graves) briefly describes a demonstration research project to determine if ISPs might be used to enhance the employability of blind and visually impaired people. The final paper, "Rehabilitation Research Past and Future" (Lawrence A. Scadden), discusses the evolution of this discipline by covering three aspects: technique, content, and impact. (YLB)

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CAREER DEVELOPMENT OF BLIND AND VISUALLY IMPAIRED PERSONS

PROCEEDINGS OF THE MACFARLAND SEMINAR

William H. Graves
Susan Jay Spungin
James Kesteloot
J. Michael Peterson
Martha Bagley
Lawrence Scadden

Sponsored by
The Mississippi State University
Rehabilitation Research and Training Center
on Blindness and Low Vision

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Martha Bagley
Training Director
MSU/RTC
November 1983

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CAREER DEVELOPMENT THEORY APPLIED TO THE DELIVERY OF SERVICES OF BLIND AND VISUALLY IMPAIRED PERSONS

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The careers of blind and visually impaired people are affected by the same events and forces which influence the careers of sighted people. Many of these forces are beyond the control of the individual (Healy, 1982). No one can control where he or she was born, who her parents were, the city or town in which he was born and schooled, the state of the economy, or even which political philosophy is in control of the White House. These kinds of events place limits on the career options available to everyone whether sighted, blind, or visually impaired. Some might argue that these environmental influences or chance factors have greater impact on blind and visually impaired people than on sighted people because of the personal attributes intrinsically and extrinsically associated with blindness and visual impairments. Attributes which are intrinsically linked with visual disorders include those which are inherent and essential to the disorder; for example, reduced visual acuity is an inherent characteristic of some visual disorders. Suppose a young lady is interested in aeronautics. Given the current technology, blindness inherently prevents a person from having a career as an airline pilot. It does not inherently prevent her from working as a computer programmer. Extrinsic attributes of blindness, which are social factors, such as prejudice against blind people, or non-essential factors associated with the disability, may prevent her from securing a job as a computer programmer and advancing in her career but there is no inherent attribute of blindness which prevents her from working in this position. If chance factors and the intrinsic and extrinsic attributes of blindness and low vision exert considerable control over the career development of blind and visually impaired people, why should efforts be made to devise strategies which can be used by professionals and/or consumers to enhance the career development of blind and visually impaired people?

Some might argue that given the power that events and factors beyond the control of the blind or visually impaired individual have on his or her career development, work should not be undertaken to help the visually impaired individual plan and create who he or she wants to be and the kind of work he or she wants to do. Rather, since the effect of these events and attributes on blind individuals' career development is postulated to limit severely their

career options, some might argue it is far more humane and economical to invest our field's resources in devising ways to help blind and visually impaired people adjust to the limits placed on their career options by these chance factors and internal and external attributes of the disability.

Becoming what one can be by doing what one has the potential to do through a career is one of life's most difficult challenges. It requires continuing effort, vigilance, and adaptability (Healy, 1982). Blind and visually impaired people have the inherent potential ". . .to choose the abilities and interests they build and use such development. They can understand the world of work, including economic cycles, access routes to opportunities, and manpower programs. Furthermore, they can learn to cope with chance" (Healy, 1982, p.3). Because of the intrinsic and extrinsic attributes of visual disability, blind and visually impaired people will have to work harder than sighted people to take charge of their careers and we will have to work harder to give them the resources they need to take charge of their careers. Blind and visually impaired people who manage their careers increase the likelihood that they will have lives of happiness, excitement, accomplishment, and tranquility resembling those of the sighted population. Or maybe even be like the members of the sighted population who populate Studs Terkel's book, Working, or even giggle a bit in silent self recognition at Shel Silverstein's poem, "Hurk."

HURK

I'd rather play tennis than go to the dentist.
I'd rather play soccer than go to the doctor.
I'd rather play HURK than go to work.
Hurk? Hurk? What's Hurk?
I don't know, but it must be better than work.
(Silverstein, 1981)

Given that it is appropriate to work toward providing resources which may be used to enhance the career development of blind and visually impaired people, how then is a career and career development to be defined. A career is ". . . the sequence of major positions occupied by a person throughout his or her

preoccupational, occupational, and post-occupational life. It includes all work-related positions such as those of student, employee (or self-employed worker), and pensioner, together with complementary avocational, familial, and civic positions" (Healy, 1982, p.5). Career development is a concept which proposes that a career is built on what a person has done, is doing, and hopes to do and that careers evolve continuously through stages. Each career stage has tasks associated with it that must be accomplished if the individual is to move on to the next stage. While career stages are continual and overlapping rather than discrete intervals, each stage does continue throughout life with one stage generally dominant at each point in life.

Career development theorists implicitly assume that people have a number of choices about their careers. The theorists further assume that people will be required to decide actively among the vocational alternatives and to implement the most desirable alternative. They also assume that once the individual has identified the field that training will not only be available, but also that the individual can successfully complete the field's training requirements. It is further assumed that with training a person can successfully locate, enter, and maintain employment in that field (Osipow, 1975). These assumptions neglect the impact of the intrinsic and extrinsic attributes of blindness and visual impairments on the career development of blind and visually impaired people and, therefore, may need modification or may even be inappropriate for this group of people.

The career development of disabled people or special needs populations has received the attention of theorists in recent years (Holcomb & Anderson, 1977). The literature, however, is still remarkably sparse (Conte, 1983; Phillips, Strohmer, Berthaume & O'Leary, 1983). Less than six percent of the articles appearing in major professional journals from 1971-1975 spoke to the career development needs of special populations (Holcomb & Anderson, 1977). Of this six percent only a handful of articles addressed the career development of blind and visually impaired persons (for example, Bauman, 1971; Davidson, 1974). Davidson (1974) states that no specific career development theories exist for blind or visually impaired individuals nor have adaptations of general career development theories been made for this population. Many vocational development theorists (e.g. Roe, 1956; Holland, 1976) see inherent personality characteristics as the major determinant of vocational choice. Given the influence of the extrinsic attributes of blindness and

visual impairment, extrinsic factors are probably more critical in the career development of blind and visually impaired people than either inherent personality characteristics or specific disability factors.

Recent literature (e.g., Lombana, 1980; Winer, 1980) addresses how professionals and consumers assist blind and visually impaired persons overcome vocational problems associated with a particular career development stage - college, vocational school or, very frequently, the requirements of a specific job. While this kind of literature is itself useful, it is not directly concerned with the career development of blind and visually impaired people overall. Because this kind of literature has been generated most frequently as a response to the service needs of blind and visually impaired people, the utility of this kind of research is often limited by the specificity of the research question. As Phillips et al. (1983) have observed for research in the career development of special populations, research is needed which describes career phenomena associated with blind and visually impaired people and which explains the relationships between career attitudes, abilities, events, and outcomes. Descriptive research must be undertaken first because of the paucity of information about the career development of blind and visually impaired people.

In gathering descriptive information about the career development of blind and visually impaired people, one must not simply compare the career development of this group with the career development of the sighted persons on whom the theory was developed nor compare this group's career development with the career development of other special needs populations. This kind of research, as Phillips et al. (1983) suggest, contributes little to the development of base line data pools for the career development of blind and visually impaired people and may lead to inadequate as well as inaccurate conclusions about the career development of these people.

Descriptive studies of the career development of blind and visually impaired people must consider the influence of the intrinsic and extrinsic attributes of blindness and visual impairment. Career development theorists (e.g. Healy, 1982; Osipow, 1975) acknowledge the influence of extrinsic attributes of sighted people on their career development. For example, Healy (1982) states that in an agrarian society such as our nation in 1830 a 13 or

14 year old adolescent would have been well along in mastering the duties and knowledge of farming; whereas, today American adolescents only begin to master occupational tasks toward the end of their teens. Investigations of the career development of this special population must not only acknowledge, but also examine the relationship of these extrinsic attributes to the career development of blind and visually impaired persons.

The Rehabilitation Research and Training Center on Blindness and Low Vision is developing a model which examines the impact of intrinsic and extrinsic factors on the career development of visually impaired and blind people and how these factors might be altered or strengthened to enhance the career development of blind and visually impaired individuals. An important part of this conceptual model is its concern with both the career development of the individual and the extrinsic factors affecting the career development of blind and visually impaired persons. This model is the Career Development Intervention Strategy (CDIS); the CDIS model permits an examination of the relationship between and among the individual's career development stages, the kinds of services provided, and the service delivery system. See Figure 1.

One of the first tasks of the Rehabilitation Research and Training Center in Blindness and Low Vision has been to develop a model to guide its research activities. Because of its focus on employment of blind and visually impaired persons, career development was chosen as an underlying framework for career services. The linkage of this theoretical framework and a delineation of career services is being called the Career Development Intervention Strategy model. This model outlines ways that career services can be used to intervene in an individual's career development.

The first element of the CDIS model is career development stages. There are many theoretical approaches to career development (Herr and Cramer, 1972; Tolbert, 1974). The Center's focus is on developmental theories that examine an individual's vocational development. Theorists and researchers using this approach have drawn on a number of other disciplines. Donald Super asserts that his approaches to career development are based on "differential developmental-social-phenomenological-psychology" (Tolbert, 1974). David Tiedeman uses Erickson's (1950) theory of general personality development as the underlying theory of human development (Zaccaria, 1970). Robert

Havighurst (1964) synthesizes several theories to form a psychosocial theory (Crites, 1969). These developmental theorists hypothesize that an individual goes through a series of predictable stages accomplishing various necessary tasks which form the career development process.

Robert Havighurst's synthesization (1964) appears to be the career development approach with widest applicability. His six career development stages cover an individual's development from early childhood until death. As individuals are confronted by each stage and the tasks within it, a general life style and work style emerge. This life style defines the role of work and its meaning for the individual.

The first of Havighurst's career development stages, identification with a worker, occurs during early childhood. During this stage, a child acquires the concept of work, and this concept becomes a part of an individual's self-orientation during this early stage. The second stage, acquiring the basic habits of industry, occurs in early adolescence. At this time a child learns how to get a "job" or piece of work done. Staying on task and putting work ahead of leisure activities are also learned during this stage. The third stage, occurring in late adolescence and early adulthood, is acquiring identity as a worker in an occupational structure. During this stage an individual prepares in several ways for an occupation or job. The period of preemployment training, such as high school, college, or technical school, falls into this stage. At this time an individual gains initial work experiences through part-time or summer jobs. These early work experiences contribute to occupational decisions made later in this and other stages. The link between payment for work and economic independence is realized during this period.

The remaining three stages occur past the age of 25. Stage four, becoming a productive person, occurs in adulthood. This is the time when specific occupational skills are acquired. During this stage an individual is moving up or gaining increased responsibility in an occupation. Stage five, maintenance of a productive society, occurs during middle age and is when the peak of an individual's career is reached. At this point people see themselves as responsible members of the community and begin to pay more attention to civic responsibilities associated with their occupation. Often an individual's

attention turns to providing guidance to younger persons in stages three and four. The final stage, occurring later in life, involves withdrawal from the work force. It is during this time that people begin to look back over their life's work and accept it as productive.

These six career development stages are not reached automatically. The tasks of each stage are not always readily accomplished. Some individuals, for a variety of reasons, need help in accomplishing the tasks necessary for movement through the career development stages. Various types of career services (e.g., Jepsen, Dustin & Miars, 1982) have been used to intervene in the career development of individuals experiencing difficulty. The purpose of the career development model is to provide a framework for identification of career service intervention strategies for blind and visually impaired people appropriate for each career development stage.

The career development stage in which the blind or visually impaired person is relates to the career development services provided or planned, the site of service delivery, and the expected outcome or goal of the individual.

For example, an issue of considerable importance in the field is how does age of onset of visual impairment affect the career development of blind and visually impaired people? Epidemiological data concerning vision problems in the U.S. from the National Society to Prevent Bindness (National Society to Prevent Blindness, 1980) is highly relevant to analyses of the career development of blind and visually impaired people. The point in the career development process at which blindness has occurred is significant.

Some ocular diseases are more likely to be associated with one career development stage than another. For example, macular degeneration's highest prevalence rates occur during the ages 65-74 [55.6 per 100,000] and 75-84 [315.3 per 100,000] (National Society to Prevent Blindness, 1980). These age periods correspond to Havighurst's Contemplating a Productive Work Life Stage-Stage VI (Havighurst, 1964). Figure 2 shows the six stages of Havighurst's career development process and the five leading causes of legal blindness for these stages. The most prevalent cause of legal blindness among persons who are 10 to 15 years old and who are in Stage II - Acquiring Basic Work Habits is prenatal cataracts; while, for those persons who are 25 to 40 years old and who are in the fourth stage or Becoming a Productive Person,

the most prevalent cause is retrolental fibroplasia.

Different kinds of career development strategies are needed for persons who experience blindness during Stage I, Identification with a Worker, than are needed for those who experience blindness during Stage V - Maintaining a Productive Work and Social Life. In these two examples, the 7 year old child most likely will benefit from a career development strategy which focuses on increasing the child's awareness of self, careers in general, her/his skills, economics, and education (Kirkman, 1983). The 45 year old adult most likely will benefit from a career development strategy which focuses on providing services, aids, and job or worksite modifications which permit the adult's career development needs to be accomodated as much as possible in the current career setting with minimal life style change requirements.

As one considers the epidemiology of ocular diseases and the career development stages, one might relate these to occupations by their age of entry and retirement requirements. For example, in early entry and early retirement occupations such as the military, police, or fire department, one might expect few careers to be interrupted by macular degeneration whereas glaucoma might be expected in these occupational groups. In fields like the ministry where there are a number of older workers, one might expect to find macular degeneration, senile cataracts, and glaucoma.

For over forty years, career development theorists have been attempting to determine which clients could benefit from or need different kinds of career development services. Holland, Magoon, & Spokane (1981) report that most career interventions have similar but small effects on the career development of sighted individuals. Fretz (1981) notes that the outcome of career intervention services might well be dependent on sighted client career development relevant characteristics such as career maturity and career decidedness. Research also suggests that gender differences for the sighted influence the outcome of career interventions (Power, et al., 1979; Fretz & Leong, 1982). Age might also affect the outcome of career development interventions. For example, Krumboltz, Scherba, Hamel, & Mitchell (1982) report older sighted males made poorer simulated career choices than sighted females and younger sighted males after receiving rational decision making training.

These kinds of results are not unanticipated, for sociology has shown us that life experiences are different for women, blacks and other ethnic groups, lower and upper classes, and disabled persons. The researcher has to take into account the differences in populations. While it is clear that disability brings with it different kinds of life experiences, it is not clear that the career development process is differentially affected by the life experiences accompanying disability. For example, many rehabilitation counselors and employers have made erroneous assumptions about the degree of vision necessary for people to function effectively in the performance of certain occupations (Rusalem, 1972). Consequently, individuals who are blind or visually impaired may have been encouraged to take jobs in fields requiring less vision, but they may have found these jobs unable to meet their career development needs. The effect on an individual's career development of limiting career opportunities because of disability-related factors is not known.

The field of blindness has placed considerable importance on the development of techniques and resources to assist visually impaired persons achieve vocational adjustment. A 1980 study of the North Carolina Rehabilitation Research and Training Center in Blindness (1980) indicated that no less than eight priority 1 research areas were identified by over 200 public and private organizations involved in work with blind and visually impaired people which relate directly to the career development intervention model developed by the Research and Training Center. These eight priority 1 areas include unemployment and underemployment of blind and visually impaired persons, employment support services, career growth, job development, job identification, referral services, and societal barriers to the employment of the blind and visually impaired population.

The career development intervention model being developed by the Mississippi State University Rehabilitation Research and Training Center on Blindness and Low Vision links Havighurst's career development model (1964) and career services in a way that will enable researchers to investigate the effects of severe visual impairment on career development. The CDIS model is very straight-forward. Career services, site of service delivery, and employment outcome are arranged on a cube that clearly delineates possible

combinations of services, sites, and outcomes. This model of interventions can function within any of Havighurst's six stages of career development.

Eight career service areas that appear to cover the spectrum of currently available intervention services have been identified. Along with six possible service delivery areas and four service outcomes they comprise the currently identified components of the intervention model. The services included in each of the eight employment service areas can be delivered in each of the six sites with any of four possible outcomes resulting. The career service areas will be discussed first, followed by service delivery sites and possible outcomes.

Career Services

Identification and Referral. Identification includes delineation of the visually impaired population and their career development needs. Referral involves linking individuals with services that will meet their career needs. Important issues include methods of locating potential service recipients, identifying those in need of career development services, and making linkages to appropriate services.

Client Assessment Services. Assessment is simply the evaluation of the visually impaired person in any one of several possible areas. Particularly important is vocational assessment to determine the potential for mastering skills required by a certain job. Equally important is the ability to assess an individual's current vocational skills, work abilities, and career development status. Psychological assessments are also important in gauging the individual's personal adjustment. Assessments of social and mobility skills also provide important information. Assessment results often become the basis for planning individual training and rehabilitation programs.

Adjustment Training. Work adjustment services provide training in all the interpersonal and personal skills necessary to perform successfully in a work environment. A worker must be able to relate to co-workers and supervisors within a work context. Personal skills such as punctuality, task orientation, and concentration must also be developed in order to become a successful worker. Development of various work abilities such as kinesthetic memory is also a part of work adjustment training.

Included in this category are prevocational training and training in job seeking skills. Often basic concepts such as "work" must be taught. Many times an individual must be encouraged to incorporate the role of worker into his self-concept. Services covered by this category should give the individual the basic skills necessary to obtain and keep a job.

Interactive Capability Training. This service area covers personal adjustment and social training, particularly in areas that relate to employment. Examples of personal adjustment training that might improve employability are personal grooming, posture, appropriate dress, self-presentation, and mobility skills. Social interactive training might include telephone skills, personal interview skills, and general social skills such as table manners.

Client Vocational Education/Training. Any type of training that contributes directly to an individual's employability can be considered vocational education training. Remedial education, college, technical school, or special vocational training programs can be included. The training must, however, be directly related to employment. Vocational/Educational guidance programs are ones which facilitate an individual's career development. Techniques which might be employed in these programs include, for example, training in rational decision making, cognitive and behavioral problem-solving training, career guidance workshops, and guided field trips.

Employment Support Services. Any service that provides help to the individual in a work setting is considered an employment support service. This help might include services from a low vision clinic, modification of machinery or the work environment, special devices (e.g., optacon or CCTV), or special services (e.g., readers or drivers). The service must provide support in a work environment even though it might also be useful in an individual's home. The service must be supportive to the extent that it enables a person to work or obtain work.

Attitudinal Barriers Reduction Strategies. The attitudinal barriers addressed here are primarily those encountered in work settings. They include attitudes held by employers and employees that act as barriers to visually impaired workers. Negative or stereotyped images of visually impaired persons form the basis for these attitudinal barriers. These attitudes inhibit ini-

tial employment, advancement, and often successful job performance. Barrier reduction strategies are those techniques used to dispel negative or stereotyped images of blind persons. Public education campaigns are one example of a barrier reduction technique.

Rehabilitation Professional Education Needs. Rehabilitation professionals need specialized educational programs in order to provide services which lead to the employment of visually impaired clients. These educational needs might be met through continuing education programs, university education, and other professional education opportunities. The content of these programs might fall within any of the areas previously described.

Site of Service Delivery

Six possible service delivery sites have been identified. Career services included in the eight categories just described could be delivered through each of these sites.

State Rehabilitation Agencies. Each U.S. state and territory has an agency that provides vocational rehabilitation services to blind and visually impaired persons. Some of these agencies run various direct service facilities, while others provide basic counseling, referral, and placement services. These agencies are funded in part by the Federal government and are subject to certain Federal operational regulations.

Rehabilitation Facility. Included here would be any facility providing rehabilitation services to visually impaired persons that are not included in any other category. Some of the services these facilities might provide are personal adjustment services, orientation and mobility training, prevocational training, low vision services, and medical services. Many rehabilitation facilities are independently operated. Others are associated with state vocational rehabilitation agencies, sheltered workshops, and medical centers.

Sheltered Workshop. Any work setting that is protected for handicapped individuals falls into the general category of sheltered workshop. There are several types of workshop programs including a "regular work program," a "work activities center," a "training program," and an "evaluation program" (Whitehead, 1979). Many sheltered workshops operate more than one of these programs. Work activity centers are generally for persons whose impairments are so severe that their productive capacity is non-competitive. Regular work

programs strive to support themselves through the production of articles of value in the market place.

Many sheltered workshops employing a majority of blind persons are affiliated with the National Industries for the Blind (NIB). NIB negotiates contracts and provides assistance to rehabilitation programs in affiliated workshops.

Residential Schools. Residential schools for blind and visually impaired children provide elementary and secondary educational services. Many residential schools have day and outreach programs. In addition to the usual educational curriculum, many residential schools provide prevocational training, assessment services, and social services. Over the past few years the characteristics of students in residential schools have changed. Today these students tend to be multiply handicapped and more severely disabled.

Educational Institution with Mainstreaming. With the passage of Public Law 94-142, education within public school systems became more accessible to visually impaired children. Many school systems now have special programs for visually impaired students. The children who typically utilize these elementary and secondary programs are not multiply handicapped; many visually impaired students who are less severely disabled are mainstreamed into the regular school program.

Self-Help/Consumer Group. The national organizations of blind persons sometimes sponsor special programs to aid their members. Referral and identification of specialized resources is one service frequently provided. At the local level, self-help groups have been organized as part of the 1970's self-help movement. These groups offer peer support as well as concrete services which may impact on the career development of the visually impaired consumer.

Employment Outcomes

Four possible service outcomes were identified which correspond to the employment categories used in vocational rehabilitation programs. Any of these outcomes could result from any one of the eight services, regardless of the delivery site.

Competitive Employment. Competitive employment generally refers to employment within sighted industry: in other words, employment in a com-

petitive setting. Visually impaired persons who are competitively employed are working at the same productivity level as are sighted workers.

Business Enterprise. The business enterprise program (BEP) is administered through State Vocational Rehabilitation agencies under the Randolph-Shepard Act. This program is sponsored in part with Federal funds. Business enterprises are typically vending, short order, or cafeteria style stands. The Randolph-Shepard Act established a priority for locating stands operated by blind persons in Federally operated facilities such as post offices, military institutions, or office buildings.

Sheltered Employment. A sheltered workshop provides sheltered or protected employment. It is important to remember that sheltered workshops vary. Oten employees are working at a highly competitive rate.

Home and Unpaid Work. Any individual who is employed but not salaried is a home or unpaid worker. Homemakers or home workers are employed within their own homes and are providing care for their own families.

Each of the research projects of the Center focuses on issues pertinent to the CDIS model. "Demonstration of a Low Vision Aid Clinic as an Employment Enhancement Technique" is studying how low vision aids might be used to enhance productivity and assist a person to accomodate her or his low vision needs in the work place. Most of the subjects in this study are in Stage IV, Becoming a Productive Person, or Stage V, Maintaining a Productive Work and Social Life. "Industrial Services Program Model for Sheltered Workshops for the Legally Blind Worker" is an attempt to design a pre-employment training program which might be used by sighted industries as a part of their affirmative action programs. It is a demonstration of an employment support service. Most of its subjects are in Stage IV, Becoming a Productive Person. "Illumination Level and Color Contrast Studies as Related to Worker Productivity" is also an employment support services project. It is an attempt to modify work sites through an assessment procedure which establishes an individual's optimal illumination and color contrast requirements for a specific job. The subjects in this project are generally those in Stage IV and V. "Development of Electromechanical Vocational Assessment Technology for Finger Dexterity and Hand/Foot Coordination" is an attempt to develop assessment procedures for finger dexterity and hand/foot coordination skills

for persons who are in Stages II, Acquiring Basic Work Habits, and III, Acquiring Identity as a Worker in the Occupational Structure, and who may also have multiple handicaps. "Modification and Adaptation of the Vocational Education Readiness Test for Blind/Severely Visually Impaired Individuals" has two primary goals. The first is to adapt the Vocational Education Readiness Test for blind and visually impaired persons who are considering careers which require vocational training such as automobile mechanics and to develop vocational assessment techniques which might be used to assist blind and visually impaired people in making decisions about pursuing careers in fields such as management and sales.

"Functional Outcome for Blind/Severely Visually Impaired Clients of State Rehabilitation Agencies" is a study of 625 blind and legally blind cases closed in status "26" and "28" in three fiscal years in four states. The outcome study focuses on the contribution of the intrinsic and extrinsic attributes of blindness and low vision to outcome.

"Assessment of current Career Development Intervention Services and Needs of the Blind or Severely Visually Impaired Individual" is an effort to assess the impact and availability of career development services on blind and legally blind persons in this country. The survey includes approximately 1000 students (grades K, 3, 6, 9, and 12), one of their teachers, their parents, 500 adult consumers, 300 rehabilitation counselors, and 150 rehabilitation agency heads. The data from these surveys will be used to refine the CDIS model and to describe some elements of the career development of blind and severely visually impaired people.

The major task for this center is to continue to work toward the development of a career development model which might be used by consumers and professionals in the enhancement of the career development of blind and visually impaired people. There is a need to remind ourselves that:

a. career development is important for blind and severely visually impaired people;

b. blindness or visual impairment does not override the individual's other characteristics;

c. extrinsic attributes of blindness and visual impairment limit the career development of blind and visually impaired people more than the intrinsic characteristics;

d. skilled professionals and committed consumers can enhance the career development of blind and severely visually impaired people through the use of technology and other research products; and finally,

e. the career development of blind and visually impaired people is neither arrested nor retarded and that their career development must not be left to chance.

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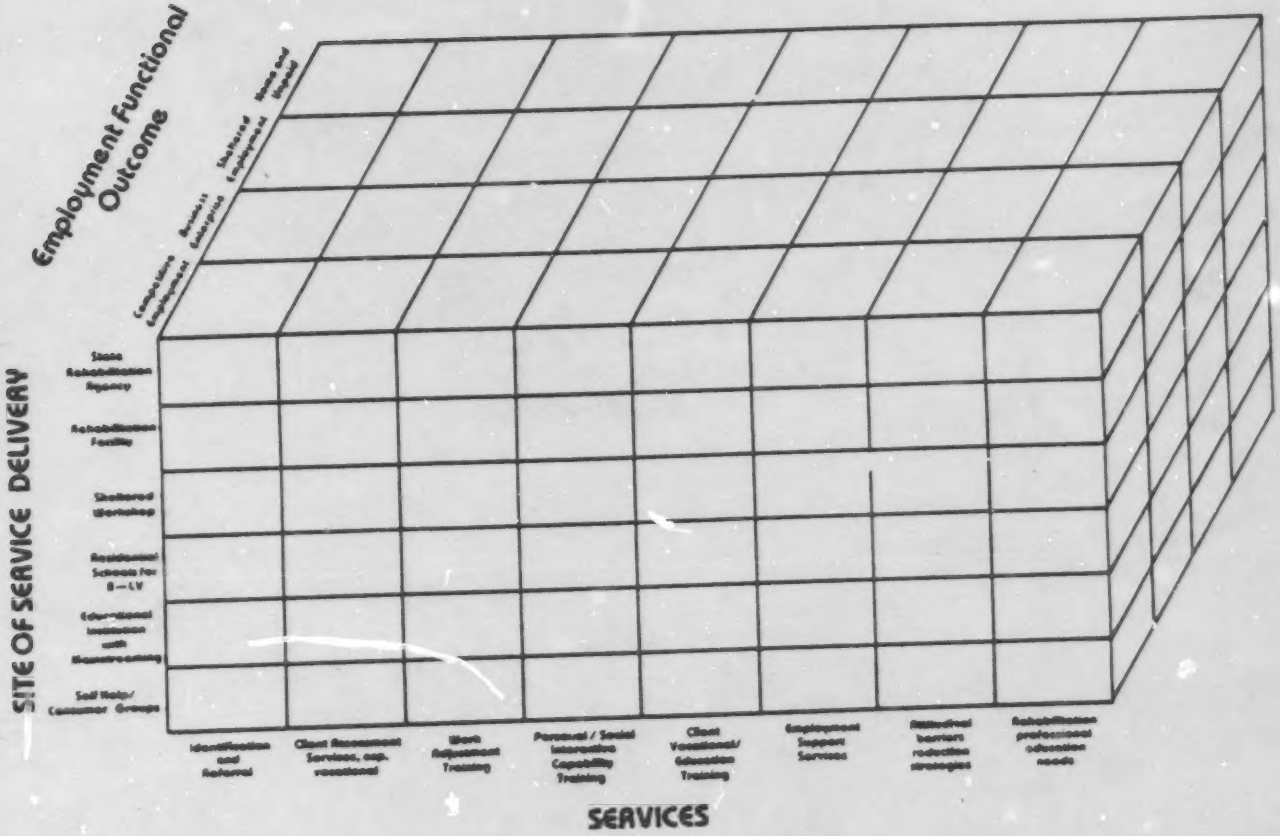
Figure 1. Career Development Strategy based upon the Career Development Intervention Strategy model developed by the RRTC and Career Development Stages (Havighurst, 1964).

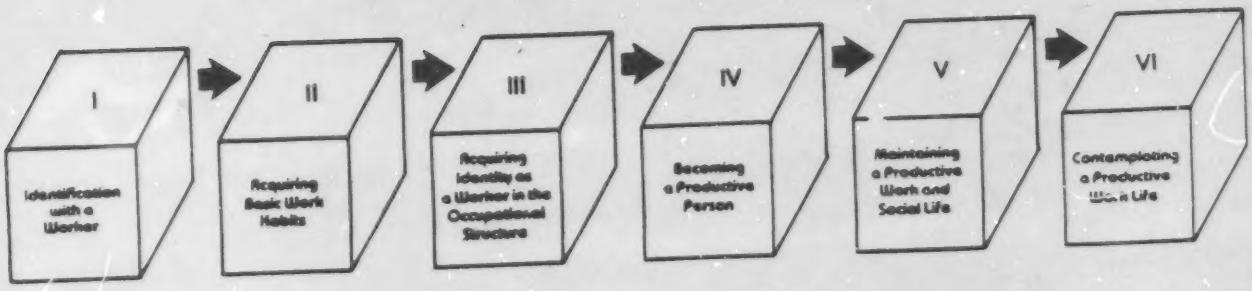
CAREER DEVELOPMENT INTERVENTION STRATEGY MODEL

INTERVENTIONS



CAREER DEVELOPMENT STAGES

(Havighurst, 1964)



Interventions may be applied within any career development stage

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Figure 2. Leading causes of legal blindness and associated career development stages, all ages and sexes. Prevalence rate per 100,000 according to estimates of National Society to Prevent Blindness, 1980.

	CAREER DEVELOPMENT STAGES						
		I	II	III	IV	V	VI
	Ages < 5	5-10	10-15	15-25	25-40	40-70	70+
Leading Causes of Legal Blindness	Prevalence Rate Per 100,000						
0-5 Years of Age							
1. prenatal cataract	6.8						
2. optic nerve atrophy	5.2						
3. retrolental fibroplasia	3.9						
4. anophthalmos, microphthalmos glaucoma, congenital	2.6						
5. retinoblastoma	2.6						
5-19 Years of Age							
1. prenatal cataract		8.0	8.0	8.0			
2. optic nerve atrophy		7.5	7.5	7.5			
3. retrolental fibroplasia		5.2	5.2	5.2			
4. albinism		4.4	4.4	4.4			
5. myopia		4.0	4.0	4.0			
20-44 Years of Age							
1. retrolental fibroplasia				11.4	11.4	11.4	
2. optic nerve atrophy				10.9	10.9	10.9	
3. retinitis pigmentosa				7.9	7.9	7.9	
4. prenatal cataract				5.7	5.7	5.7	
5. myopia				5.2	5.2	5.2	
45-64 Years of Age							
1. glaucoma, except congenital						27.7	
2. diabetic retinopathy						24.2	
3. retinitis pigmentosa						21.8	
4. optic nerve atrophy						21.2	
5. senile cataract						13.3	
65-74 Years of Age							
1. glaucoma, except congenital						115.5	115.5
2. diabetic retinopathy						74.7	74.7
3. senile cataract						57.6	57.6
4. macular degeneration						55.6	55.6
5. optic nerve atrophy						41.5	41.5

CAREER DEVELOPMENT IN AN EDUCATIONAL CONTEXT

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INTRODUCTION

The concept of career development as defined by Dr. Graves' presentation as "a sequence of major positions occupied by a person throughout his or her preoccupational, occupational and post occupational life" is, in a broad sense, a parallel definition one can find in the educational literature under the term career education. In a sense the terms career development and career education can be viewed as encompassing the same stages of content with the major exception that career education is more broadly defined by educators to include career development as one of several areas of concern and instruction.

CAREER EDUCATION AND CAREER DEVELOPMENT

Career education is recognized today to be an essential perspective in each student's education. It is a continuing process which emphasizes human growth and development, self concept, career development, economics, employment and labor market information, vocational guidance, vocational education and work adjustment (Super, 1957; Goldhammer, 1971; Bottoms & Matheny, 1969). The following major components of a career education program have been identified as follows: (Kokaska, 1983)

- Materials and techniques for classroom instruction in career development.
- Parent/family training and participation.
- Cooperative planning with community agencies and business/industry.
- Systematic program design and evaluation.
- Career/vocational assessment, training, and placement.
- Personal counseling and decision making.
- Personnel development including regular class teachers, vocational educators, special educators, and university professors.

Hoyt (1973) indicates "Career education is the curriculum which results in career development concepts and subject matter concepts being brought together

in an instructional system. Career development introduces those concepts which are related to attitudes and appreciations, copying behaviors, career information, decision making, educational awareness, lifestyle and self development."

Brolin (1974) states: "Career education is the process of systematically coordinating school, family and community components together to facilitate each individual's potential for economic, social and personal fulfillment."

Vandergoot, Jacobsen and Worrall (1979) stress that career development is a process that people use over the course of their working lives to receive desirable and non-monetary rewards from society.

From reviewing these definitions given by leading resources in the field, it is apparent that career education is a broadly based movement designed to improve the quality in an individual's life, not only within the labor market but within society. Using an integrated wholistic approach, career education fosters social, personal, community and vocational adjustment. Career education programs for sensory deprived persons must compensate or build in opportunities for incidental learning that may not be available or experienced. These opportunities contribute to developing skills that assist an individual in functioning as a member of the group. An awareness must be developed of behaviors that contribute to positive or negative perception by others. Consideration always must be given to our youngsters' occupational, social, leisure and interpersonal roles and relationships when looking at career patterns. As Brolin (1978) indicates "Career education is more than just a part of the educational program, it is the program."

The Historical Context. In 1970 Dr. Sidney Marland, Jr. became the Commissioner of Education in the U. S. Office of Education. The movement of Career Education was launched through the top priority given this concept by Dr. Marland (Hoyt, 1981). PL 95-207 established an Office of Career Education at the federal level and mandated similar offices on the state level, with a

state director to spearhead the efforts to develop models for delivering the concepts of career education into existing curricula. Implementation of Career Education under the Career Education Incentive Act was funded for 400 million dollars spread over a five year period. Dr. Kenneth B. Hoyt served as the Director of the federal agency. He produced over 50 monographs and numerous other publications. Two major journals were begun and now have been in existence about three years; Journal of Career Education and Career Education for Exceptional Individuals.

Unfortunately, PL 95-207 was an early victim to Reaganomics and career education ended up in a Block Grant for FY 82. Fortunately, monies were obtained through other funding, about 9.6 million and a continuing resolution #9735 was passed in Congress which permitted for the same funding in FY 83. Dr. Ray Warner, the current acting director in charge of the Career Education Division, recently indicated (telephone) that he expected this funding level to continue. However, as a result of the block grants, many states started phasing out their Career Education offices due to the uncertainty of funds. Key personnel transferred to "safer" parts of state education systems. Most funds earmarked for Career Education are now being funnelled down to LEA's; some of which have well-developed Career Education Programs.

Career Education Goals. There are three major goals which have been articulated by the Office of Career Education.

1. "To provide ALL students at ALL levels of the education system with a set of general employability/adaptability/promotability skills that will enable them to change with a rapidly changing society.
2. To encourage, develop, and implement "partnerships" between the education system and the broader community aimed at helping to solve the employment/unemployment problems of youths and adults.
3. To change the education system in ways that make the system a contributor to the solution, rather than to the problem, of employment/unemployment for youth and adults" (Hoyt, Journal of Career Education, 1980, 7 (2), 85-88).

One may wish to ask - why should handicapped students be treated any differently than other students attending career education programs that have been funded over this past decade. Why can't the disabled be mainstreamed into existing career education models such as, to the naive, PL 94-142 suggests. The reasons, of course, must decidely fall into the category Dr. Graves referred to as extrinsic attributes or social factors influencing the disabled population. Let's look for the moment at the statistics.

Disabled people are frequently umemployed, underemployed, or underutilized. C. Samuel Bawne (cited in Hoyt, 1976, p. 19) predicts that of the 2.5 million disabled youth who will leave our schools:

1. 21% will be either fully employed or enrolled in college.
2. 40% will be underemployed and at the poverty level.
3. 8% will be in their home community and idle much of the time.
4. 26% will be unemployed and on welfare.
5. 3% will be totally dependent and institutionalized.

Reviewing these predictions only heightens the need to develop effective appropriate career education programs for the disabled.

Career Education Objectives. What are the generic "learner outcomes" to be expected from a career education emphasis? These are statements that are a current attempt to explain what career education should produce. "Career education seeks to produce individuals who, when they leave school (at any age or at any level) are:

1. competent in the basic academic skills required for adaptability in our rapidly changing society;
2. equipped with good work habits;
3. equipped with a personally meaningful set of work values that foster in them a desire to work;
4. equipped with career decision-making skills, job hunting skills, and job getting skills;
5. equipped with a degree of self-understanding and understanding of educational-vocational opportunities sufficient for making sound career decisions;
6. aware of means available to them for continuing and recurrent education;
7. placed or actively seeking placement in a paid occupation, in further

education, or in a vocation consistent with their current career decisions;

8. actively seeking to find meaning and meaningfulness through work in productive use of leisure time; and
9. aware of means available to themselves for changing career options - of societal and personal constraints impinging on career alternatives." (Hoyt, 1981, p. 35 A Primer for Career Education).

It is indicated that these learner outcomes can occur through the development of "ten basic career education skills" which must be taught in a comprehensive, developmental manner. These skills are as follows:

1. The basic academic skills of mathematics and of oral/written communication;
2. Skills in using and practicing good work habits;
3. Skills in developing and employing a personally meaningful set of work values that motivate the individual to want to work;
4. Skills in gaining a basic understanding of an an appreciation for the American system of private enterprise - including organized labor as part of that system;
5. Skills in self-understanding and understanding of available educational/occupational opportunities;
6. Career decision making skills;
7. Job seeking/finding/getting/holding skills;
8. Skills in making productive use of leisure time through unpaid work - including volunteerism and work performed within the home/family structure;
9. Skills in overcoming bias and stereotyping as they act to deter full freedom of career choice for all persons; and
10. Skills in humanizing the workplace for oneself.

The first four skills of academic proficiency, good work habits, positive work values, and understanding the American system of private enterprise are those that most appeal to the business/labor/industry/professional and government community. The last six skills dealing with self concept, decision making and job seeking skills, use of leisure time, coping with discrimination and

humanizing the workplace tend to be valued most by parents, educators and others in the community.

The American Foundation for the Blind has been a major supporter of the early Career Education movement. Task forces and conferences were held in 1972, 1973 and 1974 and just recently in June of 1983. The May 1973 issue of the New Outlook for the Blind (precursor to the Journal of Visual Impairment and Blindness) was called the "Special Issue on Career Education." Mr. Harvey Wolfe coordinated the program efforts as the specialist in career education for several years. Quite a few pilot programs were launched within residential schools for the blind which added new information, new program organizations and creative use of staff and facilities (Coker, 1974; Weishan, 1973; Dickson & Barre, 1974; Dickson & MacDonald, 1982). Much has and is going on outside of AFB. Many communities are working on career education programs similar to Dr. Bob Long's at the Connecticut Commission for the Blind and each summer, blind and visually handicapped students are given work experience and actual jobs in their local communities.

Many career exploration curricula are being developed by the Deaf/Blind Regional Centers which have tremendous application for all our multiply visually handicapped youngsters. An excellent example is the "Work and Independent Living Training Manual" out of Texas Educational Service Center Region 20 in San Antonio developed by Dennis Didly. Also let us not forget the Texas VIEW materials available from APH.

Also, as I am sure you know, Dr. Gary Coker's work at the Tennessee School for the Blind in Career Education is outstanding. He, along with California, Connecticut and New Mexico, to mention only a few, have projects that really head the list of exceptional commitment and development of career education models and curriculum development.

Career Educational Models. Almost all of the projects in career education fall into one of three models. The first model can be called the "infusion" model. This name infers that no separate curriculum is written and all energy is spent on infusing the existing curricula with experiences and activities along with accompanying objectives which would meet career education goals.

The second model is to develop a separate curriculum which develops its own goals, objectives and activities in order to provide career education.

The third model is actually a mixture of the first two models which education personnel have devised in order to meet the goals of career education within their particular community environment.

All three models utilize "the broader community" resources as articulated in the operational definition presented earlier.

Vocational Education and Career Education. It is unfortunate that there still is some confusion regarding vocational education and career education. Some major differences appear to be as follows:

1. Vocational education delivers specific vocational skills necessary for actual entry into the working world. Career education's main emphasis is on the attainment of basic skills, decision making/job seeking, getting and holding skills and good work habits which would enable the person to change and adapt to the changing world of work.
2. Vocational education is defined in terms of courses at the secondary and post-secondary level of education (or close to it). Career education is a system-wise educational concept permeating all curriculum from preschool on up.
3. Vocational education concerns itself with paid employment. Career education is concerned with paid and also volunteer and other unpaid work.
4. Vocational education is taught by vocational educators. Career education is and will be taught by all educators through infusion (threading/weaving) process, not by career educators.
5. Vocational education tends to concentrate on specific vocational skills. Career education tends to emphasize skills such as communications, critical thinking, logical reasoning, etc., which are readily transferable from one work setting to another.

There is great need for both vocational education and career education programs. Instead of being duplicative, they augment each other.

I guess what really bothers me when discussing preparation for the world of work and all that has and is going on in career education and career development for visually handicapped children and youth is the assumption by many that basic prerequisite skills are present for the most part in our visually handicapped youngsters - that effective social as well as communication skills are in place not to mention a realistic and positive self image.

One disturbing phenomenon I have observed in increasing frequency in visually handicapped young adults is an appalling lack of communication and personal study skills. In general, braille skills of the totally blind student today tend to be poor. Ability to use slate and stylus is far below that required for the taking of class notes, and no other system has been developed for this purpose. Typing skills are poor, and many students seem to have no sense of the need to present school work in a neat, readable and coherent form. Nor do many low vision students have effective methods of taking notes in class. Many of them are unable to write well enough and quickly enough to make writing a sensible option and for a variety of reasons have not learned braille. Students, especially in higher education, tend simply to walk into class, turn on the tape recorder, and assume that the learning is being taken care of for them.

For the low vision student, the problem of being a sort of "marginally disabled man or woman" extends to many other spheres. In addition to issues of large print or braille, one of the more critical is travel. I find that "looking sighted" has taken on such a high value for some students, that their methods of getting around are sometimes positively unsafe. One wonders if we, as professionals, might not be able to do something to lessen the incredible distinction which is being made between being "blind" and being "sighted," so that all students might begin to move among their various options in travel aids, communication aids, etc., in a way that would be truly growth enhancing for them.

I find that many visually handicapped youngsters do not have an accurate picture of themselves in relation to their peers. Students tend to think either that they can do absolutely anything in a particular field, or that they can do absolutely nothing. Many students seem to be working with a serious lack of information regarding their own specific strengths and limitations.

Let's take one student, for example, who clearly was intellectually gifted and aware of her talents. She thus concluded that when she had problems in her academic career, they resulted from discrimination on the part of the authorities at the university. She had not come to grips with the fact that she was not exhibiting the requisite ability to follow through, to stay with a project or a course--simply sit down and crank out the work required. Another student was convinced that school of any sort was out of the question for him; he didn't

like it, and couldn't do it. When this student was put in an environment where materials were available to him, and when he was given the opportunity to try his hand at a new field or study--namely data processing--his talents rocketed forth, surprising many, himself included.

Finally, one quality which seems to dominate the lives of many young adults is a generalized non-interest in reaching out to life--almost a generalized lack of interest. It often makes itself evident at times when a procedure or some other bit of information is explained to a student and the question would be asked "Does that make sense? Do you understand?" The answer usually coming back is in the affirmative, but it is clear even at the moment that understanding is not present; that the affirmative answer was being given to please, or to end tension, or perhaps to avoid facing the fact that no, they did not understand.

It is little wonder that students with one or more of these difficulties encounter major roadblocks in their academic, vocational and social endeavors. For example, if one has reached the conclusion that people discriminate against him in academics, he may well respond similarly in employment or social situations. It may be that parents, teachers, vocational rehabilitation counselors and others who have significant contact with these individuals during their school years find it difficult to be forthright and honest about personal, social and academic issues. In the name of being loving and helpful, we can sometimes keep things from the student which he desperately needs to know. If we can begin to look <u>with</u> the student at the areas where he needs work, he will have a chance to move in more positive and rewarding directions.

THE NEED FOR FULL PERSPECTIVE

Many visually impaired students view themselves as "the lone ranger." Underlying many of their words and actions is the unstated premise that "I can't look different," or "I can't seem to need, or God forbid, ask for help with this." This is often true for students who have some useful vision. Let's take for example a low vision ninth grader. He must, at all costs, not appear to the rest of the world or particularly to himself to be anything approaching different much less "blind." Any teacher of the visually handicapped or low

vision specialist can attest to this in terms of the reluctance or even refusal of an individual to carry bulky equipment or use optical aids in public. This need to be at least equal in appearance and social knowledge with their sighted peers has had such an impact on some visually handicapped that they wish to do nothing to be singled out - even if it be to ask an honest question. Teachers and other professionals have, knowingly or not, reinforced this concept in the name of being better able to "compete in the sighted world."

Such a view of the world and of oneself can have very subtle and very serious consequences for a visually handicapped individual. It is appalling to realize that this emphasis on appearance, on whether or not one can manage to "look the part" can prevent the student from asking for and receiving help in the form of aids, training, or simply information, which could ease and enhance his or her life.

The problem is often compounded by mainstreamed students. A student trying to succeed in a mainstreamed situation should feel free to express concern and interest in those problems and questions common to all his peers. He or she often dare not admit questions, apprehensions, etc., for fear of being different. Perhaps we should insure all visually impaired students to spend significant time with peers, both with and without visual limitations, in order to provide a comfort level to ask questions specific to his or her visual impairment.

We need to foster situations in which students are less burdened by the evaluative distinctions so often and so subtly made regarding individuals with varying levels of vision; when such groups are brought together around particular interests, as mentioned above, very important learning can take place. Students are given the opportunity to see first hand that there are many ways of accomplishing a task--tape recorders, magic markers, slates and styli, pencils, all may be involved in the efficient recording of information for one's own use. The paraphernalia has a chance to blur, the task and its accomplishment become important. Appearing "sighted," "normal," "not different," can become less meaningful than genuine learning.

MATTERS OF THOUGHT

As professionals in work with blind and visually handicapped youngsters, we must own the fact that the ideas which we hold regarding our students, their disabilities, abilities and possibilities, will inevitably have their effect on the ways in which the students view themselves.

In our efforts to be warm, accepting and empathic, we are sometimes tempted to protect students. Honesty regarding what a student is putting out--academically, socially, interpersonally--is probably one of the most valued of qualities given a teacher by his students. Adolescence, a time of incredible change for everyone, is the time when many blind and visually impaired youngsters find that the manifold impressions received from reading, listening, touching, and attempting to engage with the world, will be coming together to form a sense of that whole and their place in it. At such a time, if the picture created is to be a true one, honest feedback is essential.

The notion of honesty ought not be be confused with the tendency to be judgmental: "You should know that by now." "Didn't your family ever teach you that?" We need the kinds of attitudes which invite and tease the student into asking those small questions--about himself or his world--the answers can bring the pieces of his own evolving picture of things into greater harmony.

We need to be cautious about the judgments we may be implicitly suggesting concerning the value of people. When we encourage a student to spend all his time with "normal kids," what is our unstated conclusion regarding youngsters with visual or other impairments? Are we making it more difficult for that student to respect others with his own disability, and perhaps even himself? This in no way is to be construed as a vote for a return to the residential school as the only appropriate center of life for all blind or visually impaired youngsters. It is only to say that we may need to balance the scales of our own thoughts, so that the youngsters with whom we work might learn to be equally comfortable with blind, visually impaired, and sighted people alike, and thus be open to the benefits that can accrue from experiences with all.

So how do we as professionals trained to work with the visually handicapped youngster help in the development of a service delivery model that creates the building blocks needed for competent visually handicapped adults? How can we insure that future generations of visually handicapped individuals will have achieved a self awareness, acquired self confidence, exhibit socially responsible behavior, develop and maintain good academic and interpersonal skills? Whose role is this anyway?

If as Brolin stated, "Career education is more than just a part of the educational program, it is the program," then is it up to special educators? And is it true that the failures of special educators are found daily at the doorstep of rehabilitation agencies? And that the reason blind people can't get jobs is because of the failure of "the blindness system?" We are the system! What are we, you and me, going to do about it?

The first step is to stop blaming each other. The second step is not only to answer parents' very first questions about, "What will the future hold for my visually handicapped child?" but to include them and their child in the career education process as it evolves. The third step is to, as a professional, define our roles--teach us that we can not, individually, be all things to all people. We must help teachers of the visually handicapped understand they are not remedial academic instructors and that they need to deal with issues of self concept and positive self worth for their students. Also, we must help rehabilitation orientation and mobility instructors finally come to believe that preschool visually handicapped children need them at least as much as the adults on their case loads do.

Career education and career development is a process that, if successful, demands collaborative efforts. Are our career education and program activities dealing with some of the issues I described earlier? What of the needs of the multiply handicapped? Career education is a process through which educators, rehabilitation specialists, vocational educational personnel and the community interact, in order to provide skill-building to students from preschool on. It has the potential to be a most effective influence on us as professionals and, consequently, on the visually handicapped person himself.

Let's take advantage of the materials available, adapt or develop those additional materials we need and, finally, develop a continuum of services for

our visually handicapped youngsters which can only take place when we start working together as a profession concerned more for our clients than our own turfdom and a misplaced loyalty for a need for separatism and professional identity.

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CAREER PLANNING FOR THE 1980'S AND 1990'S

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Whenever anyone asks where I'm from I always say "Chicago;" but I actually live in a suburb Northwest of the City. One day on my way to work at the Chicago Lighthouse for the Blind, I was thinking on the train. "How do you know if a school, agency for the blind, teacher or professional has done a good job of career planning for their students and clients?" It became apparent to me that the only way you know for sure is to check on your students or clients later in life. If your client is working up to his potential, has been promoted, is satisfied with his chosen field, has a bright future and opportunity for personal and professional advancement, one could assume that a good job was done by that individual, his teachers, and organizations for the blind in career planning. On the other hand, if the client is unemployed, does not know what he or she wants to do, is not sure of interests and talents, is not motivated, and entering "middle age" one can assume a poor job was done in career planning. I know a "lot" of umemployed blind people in this latter category.

Where will the jobs be through the 1980's and 1990's? One recent study by a David Birsh found "that only 5% of the almost 20 million new jobs created in the 1970's were in manufacturing." (Almost 90% were information, service and knowledge jobs (Naisbitt, 1982).

In "New York City between 1977-80, 40,000 manufacturing jobs were lost. It is estimated that by 1985 75% of all jobs will in some way involve computers. People who do not know how to use them will be at a disadvantage (Naisbitt 1982)."

"The real increase in service workers has been in the information occupations. The majority of service workers are engaged in the creation, processing and distribution of information. In 1950 only about 17% of persons worked in information jobs. Now more than 60% work with information as programmers, teachers, clerks, secretaries, managers, insurance people, lawyers, bankers and technicians (Naisbitt, 1982)."

The May 30, 1983 issue of Time Magazine featured a cover story entitled "The New Economy" (Alexander). It stated the jobs through the 1980's and 1990's would be in high technology fields such as jobs requiring the use of computer technology, information processing, data processing, jobs created by advancements in medical technology such as genetic engineering, and other jobs

requiring high technology such as industrial applications of fiber optics, lasers, micro-electronics, computers, and robotics (Alexander, 1983).

I once had an upset stomach which eventually caused me to see a doctor. At his office I described my discomfort and stated "I hit my head the other day. Is there any connection?" The doctor stated "everything is connected." There is a "connection" between career planning and where future jobs will be. It follows that people should plan for jobs that will exist in the future, will be in high demand, provide opportunity for future growth, and will provide future personal satisfaction.

Career planners especially those working with the severely handicapped need to know where the future jobs will be and understand the forces in the economy that influence the shape of the future job market.

"The New Economy" (Alexander, 1983) summarizes trends and forces in our economy which are determining what the future jobs will be. These trends and forces include:

1. COMPUTERIZATION - The continuing trend of atutomation through computerization is eliminating many skilled and unskilled office and industrial jobs while creating new jobs requiring new technological skills.

2. ROBOTICS - "In six years, Apple, a leading manufacturer of personal computers has evolved from a two-man operation in a garage to a corporation employing more than 4,000 people. Last year it ranked 411 on the FORTUNE 500 (Alexander, 1983)."

Just as the economy is currently going through a computer revolution we are in the infancy stage of the robotics revolution. It may have as significant an impact on jobs and our economy as computers have had. "It is estimated that there are 36,000 robots doing industrial jobs in Japan and about 6,500 in the United States (Alexander, 1983)." Thirty-six thousand robots is a significant labor force! Add to this the fact that robots can work seven days a week; robots can work 3 shifts a day; and sometimes one robot can replace several human workers at one time.

"It is estimated that by the 1990's employment in such smokestack industries as steel and autos will shrink from the present 20% of the labor force to perhaps 8%" (Alexander, 1983). One of the forces that will cause this reduction is robotics.

3. FOREIGN COMPETITION - "The U.S. imports 28% of its cars, 18% of its steel, 55% of its consumer electronics products, and 27% of its machine tools" (Alexander, 1983). "Low wage rates overseas are part of the reason for the surge in imports. Average labor costs are $1.53 an hour in South Korea and $1.43 in Taiwan, in contrast to $7.53 in the U.S." (Alexander, 1983).

   This type of foreign competition along with computerization and robotics will also have its influence on declining labor forces in the steel, auto, and other industries.

As a result of these and other trends we are currently in a recession with high unemployment, but there also are currently a large number of job openings requiring technical knowledge and skills which can not be filled. This polarization will escalate in the future with the increase in demand for workers with technical skills and a poor supply of available personnel to meet these qualifications.

Through the 1980's and 1990's "the U.S. Department of Labor projects that the largest number of job openings will be in such low-paying categories as secretaries, nurses aids, janitors, sales clerks, and cashiers. Although the total numbers are not as large, the fastest percentage growth will come in highly technical professions like computer programming and software writing" (Alexander, 1983).

As skilled and semi-skilled workers loose their jobs through computerization, robotics, foreign competition, and other trends and forces, they will not fit into the large categories of "low-paying" jobs nor will they be suitable for the new technical jobs. Their former skills were high and their potential too great for placement in the "low-paying" jobs, yet they will not possess the technical knowledge to transfer easily to the new technical job

openings. To solve some of these basic problems Alexander (1983) points out the need for the United States to have a national policy on retraining workers who will loose their jobs due to these trends.

In response to these trends we as career planners need to insure that blind persons in schools and rehabilitation systems have information on current and future jobs. For example, a blind person needs to know what a computer is, its functions, how to input information, retrieve information, print reports, etc.

Career planning should be viewed as a continuing process. There are six steps in this process.

1. ACADEMIC EDUCATION - "Perhaps the hightest concern among business executives, educators, and government officials as they view the transformation of the U.S. economy is that too many young men and women are not being well prepared for the jobs of the 1990's (Alexander, 1983)." This same concern must be applied to blind persons served by schools and agencies for the blind. A good basic education which teaches the student braille, reading, writing and mathematics is essential. All jobs require these basics. In April, 1983, "The National Commission on Excellence in Education noted that only 20% of all 17-year-olds can write a persuasive essay and only one third can solve a math problem requiring several steps" (Alexander, 1983). "A recent study done by the U.S. Chamber of Commerce found that 35% of corporations surveyed had to provide remedial basic skills training to new employees. AT&T alone spends six million dollars annually to teach workers reading and math skills" (Alexander, 1983). We have not been preparing students for the jobs of the future nor the present.

2. VOCATIONAL EVALUATION - Even though an academic education is completed an individual may not be sure of the type of vocation to pursue. If this is the case, three or four weeks should be invested in obtaining a vocational evaluation. The individual's abilities and talents, are explored and a vocational plan formulated with his or her aptitudes, skills and interests related to the existing and future job market.

3. VOCATIONAL TRAINING - Once the evaluation is completed and a career path chosen, the next step in planning involves acquiring training in a specific occupation which is the actual learning of computer programming, word processing or other profession. Many of these skills can be learned in a traditional school setting, in a specific job training program or while working through on-the-job training programs. Professionals working with blind persons and career planning need to know these resources.

4. THE JOB INTERVIEW - The individual must pass an interview and be hired. The interview may only last thirty minutes to an hour, but it is one of the most critical steps in obtaining a job. Interviewing is an art. It is possible to have two people applying for the same job. Applicant A may be highly qualified and applicant B may not be as qualified. Yet, applicant B may be selected for the position. The less qualified applicant knew what to say, what the employer wanted to know, how to stress strong points, and knew what not to say. It is important to provide adequate preparation for the interview.

5. PROBATION - The newly hired employee must successfully pass probation or lose the job. Generally all new employees are evaluated one to six months after hiring and annually thereafter. Teachers and professionals working in career planning should make their students and clients aware of the employer's evaluation process. It should be helpful to collect evaluation forms used by local business and industry. Clients could learn through examination of real evaluations the importance of such concepts as quality and quantity of work. It somehow has a greater impact coming from employers than teachers.

6. PROMOTION - A worker who is hired but never reaches the point of promotion does not complete the process. Employment without promotion signifies that the career planning process is incomplete. The client may need to achieve better than average work, may need to enhance education, or obtain further training in order to advance.

There are basically two ways that a blind person can find employment. The first is the "Viecelian" approach (named after Lou Vieceli of Southern Illinois University). This approach involves utilizing a counselor trained in job placement. The counselor contacts and meets with employers; surveys the physical facility for safety; analyzes individual jobs for safety and to determine whether the jobs can be done without sight or by a client known to the counselor; arranges interviews; accompanies clients to interview when necessary; recommends job modifications; and conducts follow ups.

The Chicago Lighthouse for the Blind relies on the "Viecelian" approach. I once contacted a Federal Agency using this approach. I went up to the personnel office and stated to the receptionist that I was "from the Lighthouse, and I was there to see the personnel manager." Before I finished the sentence the receptionist stood up and walked briskly up the hall. A few seconds later the receptionist was returning with the personnel manager. I heard him say to the receptionist "He's from the Lighthouse not the White House."

The second way a blind person can find employment is the "do it yourself method." This method simply involves teaching a visually impaired person how to contact an employer, arrange an interview, and present his or her qualifications well in an interview. This is a part of the "Viecelian approach." However, I want to point out several other trends that may result in a need to re-emphasize the "do it yourself method." First, there has been a general reduction in social service funding. Many private and government social service agencies that provide job placement services have had to reduce services and may have gone out of existence due to funding cuts. Clients will still pursue services from the agencies that survive. As a result these surviving organizations will service more persons with less funds. This situation will affect the quality and quantity of available assistance. Clients who have the ability will have to work harder for themselves. Agencies will need to do more effective training for clients in "job seeking skills." Secondly, the number of multiply handicapped blind persons is increasing. This population will have a special need for the "Viecelian" approach while the more capable blind person can supplement the traditional job placement approaches with their own efforts through proper job seeking skills training.

A client should be able to obtain his own interview. But how do you go about it? Furthermore, how do you go about it if you are blind? The following is a technique that can be used. It is called the RTLT method (resume, telephone call, letter, telephone call).

R-1. The first phase of this technique is to write a resume. Acceptable formats for resumes are available from various sources.

T-2. The client should select several companies where he or she would "like" to work. If the client is interested in being and is qualified to be a computer programmer, the client would then call the selected companies and ask for the name and title of the person who is in charge of hiring for that position. At this point the client should avoid elaborating over the phone. The only function of this call is to obtain a name and address. At this stage, it is not necessary for the client to know that a suitable job opening exists. A future contact with the employer will establish whether job openings will exist.

L-3. The career planner should instruct the client to write a short letter and attach his or her resume. The purpose of this letter is for the client;

- To introduce himself,
- To indicate his interest in working for that company,
- To indicate his or her interest in a specific job such as transcription typing or computer programming,
- To mention his visual handicap (optional), and
- And to directly ask for an interview.

Any letter to a potential employer should include comments on these areas.

The client should direct this letter to the person who is in charge of hiring for the position in which he is interested. The name and title was obtained in the previous step. Letters that are not properly addressed can easily be lost or directed to the wrong company

representative. The client should not direct a letter to "The Personnel Department." Large companies may have several personnel departments, each handling different job categories. These personnel departments may be physically separated on different floors or buildings. Large and medium size companies, even if there is only one personnel office, may have many personnel representatives. Small companies may not have a personnel department at all. Hiring may be done by department heads, supervisors, or owners. In short, use the previous step and telephone to ask for a name and title.

T-4. It is necessary for the client to follow up the letter with a telephone call since employers frequently do not answer letters. This is another important reason for directing the letter and resume to a specific person in the company. It "pinpoints" the client's contact, avoiding a search for the personnel officer having the letter.

The career planner should instruct the client to telephone the employer four to five days after the letter is sent. Four or five days gives ample time for the personnel representative to receive and read the informtion. If the client waits too long before calling (ten to fourteen days), the letter may not be fresh in his mind. The major function and goal of this telephone call is to ask for and obtain an interview. This is the most important step in the RTLT method. The client should know that the goal of any employer contact is to obtain an interview.

In the letter and resume, the client may have already mentioned that he is blind and visually handicapped. Many blind persons find this too difficult to introduce over the telephone. It is a critical and delicate subject which often determines whether the applicant will even receive an interview. There are advantages to informing the employer of the visual handicap in the letter, not the follow-up call, or at the interview itself. Ideally, the client wll not have to initiate and explain his blindness over the telephone since it was already mentioned in the letter. Generally, a personnel officer will

remember or recall this unusual fact when the client introduces himself by name on the telephone. "Hello, my name is John Doe. I directed a letter and resume to you regarding a position as a computer programmer. May I stop in for an interview?" The personnel office may respond in the following ways.

A. "Yes, I remember the letter." He may state or clearly imply that he knows you are blind as a result of the letter. This will eliminate having to introduce a new critical fact over the telephone. If this is the case, the client should directly ask for a time and date for the interview.

B. The employer may respond by saying, "yes, I remember the letter, but I referred it to another person." The blind person should be prepared to take notes. The client should telephone the new party to which his letter was referred, introduce himself, and ask for an interview.

C. The employer may respond by saying, "I don't recall any letter;" "I did not receive that information;" "I have not had a chance to read that material." This is one of the most difficult situations to handle. The client will have to explain the content of the letter, give some personal background including that he or she is blind, and then ask for an interview.

D. One of the most common responses of the employer is "Yes, I remember the letter, but I do not have any job openings at this time." The client should respond with a request for an interview anyway, since;

   (1) The employer may have jobs, but he does not believe that a blind person can do the work. Interviewing may convince him that the blind person can in fact do the job. If the client does not interview, he will not have the chance to answer the employer's concerns.

   (2) A job may open in a few weeks or months. If the employer is aware of the blind person and is convinced he can do the job, he may be hired on a future opening.

The client should avoid elaborating over the telephone. In other words, he should not be interviewed over the telephone. Employers never give jobs based on a telephone interview. If the client finds himself being interviewed over the telephone, he should be prepared to diplomatically state that he would like to talk with the employer in person regarding these subjects.

Preparing clients to seek jobs on their own is a rehabilitation "program" of its own. The Chicago Lighthouse for the Blind conducts a "Job Placement Clinic." Approximately 10 clients are enrolled 3 to 4 hours a day for 10 days. The first day the client, through role playing, is interviewed for a hypothetical job. This interview is taped so the client may observe his performance. At the end of the "Placement clinic" the client is interviewed again through role playing. Again the interview is taped. Theoretically the client improves from the first day to the last day as a result of the program content. The content of the course included filling out applications, writing resumes, how to answer employer concerns about safety, practice interviews, etc. The client views the first day interview and sets objectives to improve observed weakness. The last interview which was taped gives improvement feedback to the client.[1]

One major concern of the employer that generates questions in an interview has to do with the ability of the blind person to actually do the job. The employer wants assurance that the blind individual can meet company standards.

When the client is contacting an employer for a specific kind of job he must be prepared to answer questions regarding how a blind person will do the job. For example, a client who meets with a company representative to discuss employment as a word processor will be asked the following questions requiring answers:

1) How does a blind person know an error occurred and how will it be corrected?

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[1]The "Job Placement Clinic" concept described was developed by Steve Magers, Vocational Evaluator, Chicago Lighthouse for the Blind.

Word processors who are blind transcribe from recorded systems. The person must concentrate on the recording. Similarly, a sighted worker does not watch the keyboard or what is being typed on the paper. The sighted typist must keep the eyes and concentration on the material being read when a recorded system is not in use. Before any error is corrected the word processor must know an error occurred. This is a conscious, not a visual process. If the employee is not aware of an error, the word processor, either sighted or blind will continue typing. The error would be noticed later during proofreading. Once the word processor knows an error has occurred, the employee stops typing and corrects the error. Blind persons use the same methods as the sighted to correct errors. Word processing equipment erases errors automatically on the command of the worker.

2) Is proofreading a problem?

There are six basic controls on proofreading. Some are normal office practices:

(a) It may not be practical or possible for a supervisor to proofread everything. However, the supervisor is the first line of defense against errors for the sighted and the blind word processor. A good supervisor will know who is a competent worker and who is not; whose work needs to be checked more closely; and who will be assigned the most important projects. The supervisor is responsible for the quality of work leaving the word processing center.

(b) Some word processing centers have built-in proofreaders for special types of work.

(c) The originator of the letter or report should read what he signs as normal procedure. When the originator signs letters without reading them first, errors will be mailed, even when they are produced by a sighted worker.

(d) Some visually handicapped persons may still have enough partial vision to proofread all or some of their own typed material.

(e) A special "accommodation" can be designed into the job such as, making someone available in the office to check certain material or to be available upon request of the blind person. Minor accommodations do not decrease the production of other office staff.

(f) A major trend has developed along with the technological revolution in our economy. Electronic and other sensory aids are revolutionizing employment opportunities for blind persons. Aids are available that can convert information displayed on a CRT screen or stored in a computer or word processor to braille, large print, or speech including spelling words, identifying capitol letters, commas, periods, etc. Currently with the proper application of sensory aids a totally blind word processor can function with complete independence.

The Chicago Lighthouse for the Blind has instituted an Electronic Sensory Aids Laboratory which is designed to apply electronic sensory aids to computer related jobs. The laboratory will create access to and job placement on computer related jobs through analyzing job sites; prescribing the most cost effective sensory aid that will permit a blind person to perform the job; evaluate and train clients on various sensory aids; provide technical assistance (engineering, electrician, computer programmer, etc.) to insure that an aid is properly interfaced and functioning with the employer's existing equipment; provide loaner aids from the laboratory for use on-the-job to insure that systems "work" prior to expending funds, or for use on-the-job by a client until a personal aid can be delivered; and follow-up services to promote continued successs for persons placed. Career planners need to be familiar with sensory aids that will give blind persons access to the technological jobs of the future.

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VOCATIONAL ASSESSMENT FOR VISUALLY IMPAIRED PERSONS

-WORKSHOP A-

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Vocational assessment of visually impaired persons is extremely important because, whether it is done formally or informally, vocational assessment determines all that comes later in the rehabilitation of persons with visual impairments. While much has happened in improving the quality of vocational assessment of blind and visually impaired persons much needs yet to be done. This presentation overviews three separate but related projects of Mississippi State University that are intended to contribute to the improvement of vocational assessment services.

Vocational Specialist of the Visually Impaired

First, I would like to summarize a graduate training program to prepare rehabilitation professionals. This program is offered through the Rehabilitation Education Program at Mississippi State University (P.O. Drawer GE, Mississippi State, MS 39762, [601] 325-3331) and is entitled, "Vocational Specialist for the Visually Impaired." The Vocational Specialist program is designed to train professionals to function as Rehabilitation Counselors, Vocational Evaluators, or Placement Specialists who have training specifically oriented towards working with blind and visually impaired persons. The program is a unique interdisciplinary training program that involves 51 semester hours - 42 hours of course work and a 9 hours, full semester internship. Courses include training in the following skills as they relate to the blind person: counseling, vocational assessment, medical information, job placement, introduction to orientation and mobility training, work adjustment and personal-social adjustment. The program emphasizes both classroom and experiential learning. This program also emphasizes connection of research and training activities. Through cooperative use of staff, Research and Training Center staff teach some course work in the program and some counselor education staff are involved in Research and Training Center projects.

Electro-mechanical Work Task Units

The Rehabilitation Research and Training Center in Blindness and Low Vision (RRTC-BLV) and the Rehabilitation Division of the National Industries for the Blind (NIB) are cooperatively working on a project concerning several work samples and training tools related to manipulative skills and industrial assembly. NIB developed these work task units over the last few years at Royal Maid Association for the Blind in Hazlehurst, Mississippi, and they are currently in use as evaluation and training tools. The project with the RTC-BLV involves improvement and standardization of the existing work task units and development of two additional units. Specifically, standardized manuals have been developed that are written in the format recommended by the Materials Development Center at the University of Wisconsin, Stout. Reliability and validity studies are currently being conducted. Reliability studies are being conducted using a test-retest methodology with a total of 30 subjects. Length of time between test and retest ranges from 5 to 10 days. Validity studies involve correlation of scores on the work task units with sheltered industry production rates and with scores on other work samples. Data is being collected at the following field sites: Addie McBryde Rehabilitation Center for the Blind, Jackson, Mississippi; Royal Maid Association for the Blind, Hazlehurst and Tupelo, Mississippi; Regional Rehabilitation Center in Tupelo, Mississippi, and the Louisiana Association for the Blind, Shreveport, Louisiana.

The work task units provide assessment of various manipulative abilities and work behaviors and are intended primarily for use with the more severely handicapped blind persons whose occupational objective would be sheltered employment. Administration procedures for each unit involve: (1) demonstration of the task; (2) practice for the client until he/she has performed the task correctly 3 consecutive times; additional practice of ten minutes; and (3) performance and/or production while the task is done as quickly and precisely as possible--usually for 50 minutes. A sighted standard has been developed for each work task unit based on scores of 5 average sighted workers. In most work task units an electro-mechanical work pace reinforcer gives auditory feedback when a standard is not met. Below, the work task units are listed and summarized.

1. FINE FINGER DEXTERITY WORK TASK UNIT

Assesses:
- Kinesthetic memory
- Bi-manual coordination
- Finger dexterity
- Frustration tolerance

Task: Assembly involving: insertion of a plastic form, pins on corners, T-bar in middle, place in bin.

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighed Standard: 17 seconds.

2. FOOT OPERATED HINGED BOX WORK TASK UNIT

Assesses:
- Hand-Foot coordination
- Bi-manual coordination
- Finger dexterity

Task: Place nut on a bolt, place in hinged box, automatic counter

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 5 seconds.

3. HINGED BOX WORK TASK UNIT

Assesses:
- Tactual perception
- Material control
- Bi-manual coordination
- Frustration tolerance

Task: Place card in plastic bag, open box and place inside, auto counter

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 8 seconds.

4. INDEX CARD WORK TASK UNIT

Assesses:
- Bi-manual coordination
- Finger dexterity
- Frustration tolerance
- Memory for sequence of operations

Task: Pick up 2 cards, push to divider and then up until hear a "click". Right card to right, left to right position. Pick up another.

Feedback: Buzzer sounds when task is not completed correctly in the alloted time.

Sighted Standard: 4 seconds.

5. MULTIFUNCTIONAL WORK TASK UNIT

Assesses:
- Bi-manual coordination
- Finger dexterity
- Kinesthetic memory
- Ability to work with others

Task: Fill 168 holes with vials and assembled materials (nuts and bolts). This is done cooperatively with other clients. An observation sheet of work behaviors is used.

Feedback: Buzzer sounnds when task is not completed correctly in the alloted time.

Sighted Standard: 4 seconds.

The manuals of the work task units are presently available through the Rehabilitation Research and Training Center in Blindness and Low Vision, Post Office Box 5365, Mississippi State, Mississippi 39762, for $15.00.

Vocational assessment samples for skilled, technical and professional jobs. In a related project, the RRTC-BLV is modifying and developing materials that can be used to assess visually impaired persons for skilled, technical and professional positions. This project actually encompasses three components: (1) review of the state-of-the-art in using work samples with visually impaired persons; (2) modifications of the Vocational Education Readiness Test (VERT); and (3) development of additional assessment samples that focus on selected technical and professional occupations.

State-of-the-art-review. The first year of this project a comprehensive review of the state-of-the-art in using work samples with visually impaired persons was conducted. Information was gathered via several sources: (1)

literature review; (2) survey of manufacturers of commercial work sample materials; and (3) survey of rehabilitation facilities for the blind. A publication entitled Work Samples in Vocational Assessment of the Visually Impaired: State-of-the-Art is in press. This monograph will summarize current uses, discuss potential resources, and review recommendations for improvement. Two basic conclusions from this review, however, are: (1) there is a need for assessment samples that validly assess occupational skills and potential of visually impaired persons for skilled, technical, and professional positions; (2) improved asessment techniques are needed for the multi-handicapped blind.

Modification of the Vocational Education Readiness Test (VERT). The VERT involves a series of tests that were originally developed at the Research and Curriculum Unit in Vocational Education at Mississippi State University to assess handicapped students in secondary school for entrance into vocational education classes. Presently, the VERT consists of tests in eight areas: (1) auto mechanics; (2) basic wiring; (3) carpentry; (4) clothing (sewing); (5) masonry; (6) plumbing; (7) quantity foods; and (8) welding. Modifications are presently being made in selected appropriate tests so that they can more effectively be used by vocational evaluators working with visually impaired persons. Each test is composed of four assessment components: (1) performance sample in which actual work tasks are performed using tools of the trade; (2) tool identification; (3) vocationally related vocabulary; and (4) vocationally related computation and measurement. The adaptation of these instruments is presently in process.

Assessment samples for technical and professional occupations. This component of the project involves development of occupational assesssment materials in five areas: (1) management; (2) counseling social work; (3) allied health; (4) scientific high tech; and (5) sales and marketing. Assessment materials are presently being developed that will focus on characteristics needed for successful employment and training in these fields. Input is being obtained for this project from a number of programs including: St. Mary's College; Arkansas Enterprises for the Blind; Addie McBryde Rehabilitation Center; Tupelo Regional Rehabilitation Center; and a number of vocational evaluators throughout the nation.

JOB SITE MODIFICATIONS UTILIZING COLOR AND LIGHT

-WORKSHOP B-

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Illumination and Color as Aids to Increased Visual Acuity

As we are all aware, most legally blind persons have some usable vision. One approach to modification of the worksite for these individuals is to maximize the utility of their remaining vision. It is generally accepted in the rehabilitation of low-vision individuals that adequate illumination levels and strong color contrasts are important in optimizing residual vision. Unfortunately little research has been conducted that actually indicates the effects of light and color on the use of residual vision.

Illumination studies. Has anyone ever told you "don't read in the dark, you'll strain your eyes?" You probably will not strain your eyes, but you probably will not see as well as you could. Most of the literature concerning illumination and color as visual aids focuses on the positive effects of lighting levels on worker productivity (Lehon, 1980). For example, in a study of sighted clerical workers, higher illumination levels resulted in higher productivity and higher acceptability ratings, especially by older workers (Hughes & McNelis, 1978). Another study found that older workers are especially vulnerable to imperfections, such as glare, in lighting conditions (Boyce, 1973). These findings are especially important given the higher incidence of visual impairment among elderly persons (Sekular, et al., 1982; National Society to Prevent Blindness, 1980).

Studies show that most partially sighted individuals benefit from higher light levels. Additionally, there appears to be a greater variation in the intensity or foot candle level of lighting condition chosen by visually impaired persons than by sighted persons (Lehon, 1980). Variations in lighting levels have been related to medical diagnosis, the size of type being read, and the individual illumination controls utilized (Steiner, 1969).

Color research. "That red car stands out like a sore thumb," is a fairly common observation. I'm not sure quite how a sore thumb stands out, but a bright red car might actually be easier to spot in traffic or a parking lot. Color contrasts have often been discussed and utilized as an aid for visually impaired persons.

There appears to be a relationship between the degrees of contrast and reflectance of two materials and the light needed to see them clearly. For example, dark thread on dark cloth requires higher levels of light to perceive than black print on white paper (Crouch, 1968).

Color has frequently been used to increase visual efficiency in various settings (Sicurella, 1977; Corn, 1980). However, few studies have actually tested the effects of color contrasts on visual performance. As with illumination levels it appears that there is considerable individual variation in optimum color contrasts.

The Research and Training Center's Illumination Level and Color Contrast Study

Approach to the study: The objectives of the Rehabilitation Research and Training Center's light and color study are to:

- develop strategies for work site modifications for severely visually impaired persons utilizing light and color;
- determine the impact of such work site modifications on the productivity and comfort levels of persons with severe visual impairments; and
- establish the contributions of low vision aids to these work site modifications.

This study is investigating optimum illumination levels and color contrasts in very specific working conditions. The illumination level of the work site and the predominate work material are used as the basis for determining the individual's optimum illumination level and color contrast. Individuals participating in this study are all legally blind employees of Mississippi Industries for the Blind in Jackson, Mississippi, who are performing sewing tasks. This study is based upon work done by George Aarons (1981) at The National Industries for the Blind's demonstration workshop, Royal Maid Association for the Blind, in Hazlehurst, Mississippi.

Testing Procedure. The first step in the testing procedure is to determine the optimum illumination level. A light frame is used to test illumination levels. The frame is a horizontal platform with a rectangular mounting for light tracts fastened on one side. The frame itself is painted a flat gray. Two incandescent lights are mounted on the light tracts. These lights are controlled by rheostat switches. A cross bar keeps the individual being tested from getting too close to the test materials.

The light level is first adjusted to reproduce the lighting in the individual's work place. This is easily accomplished with a light meter. Starting from this base point the individual adjusts the light, using the rheostats, while viewing a 5 X 7 inch neutral black and white card. When the most comfortable lighting level has been selected visual acuity is tested using cards adapted from an illiterate E acuity chart. The lighting or foot candle intensity is then raised and lowered and acuity tested and retested to determine the lighting level associated with the greatest level of acuity. The light intensity associated with the greatest level of acuity is considered optimum.

When the optimum light level is established the optimum color contrast is determined. Color contrast was tested with two sets of cards. The first set of cards contain landolt or donut shaped rings in various colors that contrast with the individual's basic work material. The cuts in the landolt rings vary from 10 MM to 1 MM. The second set of cards contain circles with pin point cut outs, again mounted on a background of the predominant work material. The pin points vary from 6 MM to 1 MM in diameter. The individual being tested uses a stylus to locate the break in the landolt ring or the pin point. The color contrast associated with the shortest average response time (time needed to find the cut or pin point) over the different sizes is considered optimum.

Modifying the worksite. After the testing was completed, job site modifications were made. Because everyone tested performed a sewing task, modifications were made to industrial sewing machines.

Most industrial sewing machines have goose neck lamps mounted on them. The light modifications involved turning the lights on, repositioning the lamp, or increasing the light intensity by utilizing a higher wattage bulb. In some cases the existing lamp had to be replaced in order to accommodate a larger bulb.

The color modification involved painting the machine "presser foot." This is the part that holds the fabric in place and guides the stitch. Paints were mixed to match the colors used in testing. A flat paint was used to reduce the glare associated with an enamel or glossy paint.

Results. Study results are currently inconclusive. The production pattern exhibited in the test data--after modifications were made--indicated improved productivity. However, this improvement is not significantly different from baseline production rates--rates before any modifications were made. Individual work rates appear to be influenced by many factors, such as mood or physical well being, other than the ability to use residual vision or see the task.

Low Vision Modifications Utilizing Color and Light

When we think of how vision aids, sensory aids or environmental modifications, we tend to think of high technology. There are many very effective low technology, easy to do, and relatively inexpensive aids that are readily accessible by visually impaired persons. Many of these aids utilize light or color. The following lists highlight many color and light modifications (Corn, 1980).

Reading and Writing.

1. Colored acetate over printed material, particularly yellow over mimeograph sheets, helps to highlight printing. Different colored pens can also be used to highlight the printing. They have different effects depending on the acetate color. Lime green acetate is often helpful on CRT screens.

2. A black or dark sheet of paper behind a thin or poor quality paper eliminates shadows. This is very useful in reading the telephone yellow pages.

3. A sheet of black paper behind a glaring white page helps to cut down on the brightness of the page.

4. A template or reading guide made from a sheet of dark colored paper is often helpful in reading.

5. When reading before an audience or highlighting printed documents for future reference, using colored lines to divide sections or underline ideas is helpful in relocating material.

6. Using highlighter pens is also helpful. These pens now come in fluorescent colors which are often easier to see. Numbers in a telephone book or information contained in directories or long lists can be easily relocated if they are highlighted.

7. For reading lined paper, lines which are not too bold are best. Dark lines may help in writing, but they can create reading problems. Try using a writing guide and using a felt tip pen in a color different from the lines.

8. When reading a map place one finger on the starting point and one on the destination. This will help to direct the eye along the route.

9. Colored dots from a stationary store can be used to color code items in a file or on a rolodex. Always keep a key to the color codes. For people with peripheral vision large dots are easier to see.

10. When writing something that must be read immediately, like math problems, use a thick felt tip marker.

11. Illumination can be increased by using a lamp.

Environmental Cues.

1. A wrist watch with a solid background face and contrasting hands is easier to read than a watch with a shiny surface.

2. Small metallic objects like nuts and bolts or coins can be seen better against a black background.

3. Learn to use shape cues as an aid in recognizing people or objects at a distance. For example, a car and a bus have a very different shape.

4. Contrasting vertical and horizontal sections on a stairway makes the steps easier to see. A bright contrasting color on the edge of the step makes it easier to distinguish going up and down.

5. Bright colored hand rails or doors can help to locate stairs and entries.

6. A switch plate or door knob that contrasts with the color of the walls or door is easier to locate. Colored tape or a template of colored paper can be used around the switch plate or behind the door knob.

7. When setting the table remember to use place mats (cloth or paper) to separate light colored dishes from a white table or dark dishes from a wooden table. Be careful not to cause confusion by using dishes and placemats with conflicting patterns. Different textured placemats are also often helpful.

8. Try to choose solid color carpets and floor surfaces. They will make it easier to distinguish stairs and inclines. Solid colored upholstery and bed linens make it easier to locate things placed in a chair or on a bed.

9. A clear plastic shower curtain will allow more light into the shower.

10. Bright colored combs and toilet articles are easier to locate in a purse or overnite bag or even on a bathroom shelf.

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INDUSTRIAL SERVICES PROGRAMS: A NEW ROUTE TO JOBS IN THE PRIVATE SECTOR FOR BLIND AND SEVERELY VISUALLY IMPAIRED WORKERS

-WORKSHOP C-

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"More than 40,000 communities throughout the country suffer from varying degrees of unemployment, chronically low per capita income, and general decline in the quality of life" (Tuttle & Wall, 1979, p. 7). Many communities decided to solve these problems by attracting new industries and encouraging existing industries to expand. For an industry to expand or relocate, it must have a sufficient supply of qualified workers. To make certain industries are provided with the necessary trained labor force, many states and communities have organized industry service programs (ISP). "Industry services programs offer a means for public agencies and institutions to become involved in recruiting, testing and training workers for private industry. Such services are necessary when more traditional vocational curriculums do not satisfy the unique needs of a particular industry, when students participating in existing programs are not available for immediate employment or when qualified workers are not otherwise available in the community" (Tuttle & Wall, 1979, p. 7).

A comprehensive ISP accomplishes at least three major purposes of benefit to both the community and the industry: job training, job creation and job placement. Job training provides industry with a trained labor force and enables citizens in the community to acquire the skills necessary to enter new or better jobs. In addition to learning job skills, trainees acquire the values, attitudes, interest and related knowledge appropriate for the occupation in which they seek employment. Job creation takes place as occupational opportunities in the community expand through industrial recruitment and expansion. Job placement comprises all the activities carried out to place trained people in jobs. Once completed, training must find fruition in satisfactory employment. Thus, the success of job training and job creation depend on effective job placement (Tuttle & Wall, 1979, p. 9).

Most individuals who enter ISPs are either in the labor force already or they are attracted to the program because immediate employment after training is virtually assured. ISPs may be provided in public training facilities on the student's own time or in industry

facilities during working hours for prospective or already employed personnel. Pre-employment and in-plant training are the two broad categories of job training of an ISP. Pre-employment training is conducted for prospective employees before a new plant opens or when an existing industry expands. It is designed to prepare the trainees for immediate employment and is not limited to particular target groups. Many participants in pre-employment programs are already employed, but wish to compete for new jobs. The pre-employment training program is conducted three or four nights per week for nine to sixteen hours. The trainees have no firm commitment they will receive a job, but successful completion of training usually insures that a job offer will be made. In-plant training is for workers employed by an existing industry or business that is trying to improve the quality of its product or service, is entering the expansion program, or is adapting to changes resulting from technological advancement. Both job-skill and worker orientation may be included in the in-plant training programs. Worker orientation training is designed for individuals who have basic deficiencies that would hinder successful skill training as well as progress on the job. In-plant training is conducted on the production line or in some other appropriate area at the plant site. The training lasts as long as necessary to meet pre-established proficiency levels. Client company supervisors may provide instruction for in-plant programs.

ISPs help people who are untrained, unemployed, or underemployed move into productive and rewarding careers. The payoff for participants is immediate because the instruction provided is linked directly to actual jobs in industry. Each participant receives specialized training based upon clearly stated industry needs. Therefore, the participant's value in the competitive labor market is increased significantly. Each ISP is a partnership between an industry and one or more local or state agencies. The industry receives several benefits from this joint endeavor. Individuals are trained at low cost to the industry, the participants already employed learn new skills that enable the industry to achieve increased productivity, and the industry is able to operate more efficiently with better trained personnel. Large corporations such as Litton Industries, Weyerhauser, Dupont, Kimberly-Clark and Phelps Dodge

as well as smaller ones such as Chef Pierre, Duo-Fast, and Milwaukee Electrical Tool Corporation utilize ISP in the employee training process.

Industrial Service Projects and Blind and Severely Visually Impaired Trainees

To assist blind and visually impaired people obtain jobs in the private sector, the Rehabilitation Research and Training Center on Blindness and Low Vision in coorporation with the Mississippi State University Research and Curriculum Unit for Vocational Technical Education is sponsoring a demonstration research project to determine if the ISP model might be used to enhance the employability and employment prospects of blind and visually impaired people. The research project is divided into two phases. The first phase, which is currently underway, is designed to determine if the ISP model can be used to increase the overall productivity of blind and legally blind workers who are newly employed by a protected industry for the blind. The second phase of the research project is to adapt the ISP model developed in the protected industry (Phase 1) for use in an ISP designed for a company which employs primarily sighted workers and to determine if the adapted ISP might be used to enhance the employability and employment prospects of blind and severely visually impaired persons in nonprotected, i.e. competitive industries.

RTC-ISP Research Project Phase 1

The RTC-ISP project Phase 1 was developed for Mississippi Industries for the Blind (MIB). MIB was selected to demonstrate the adapted ISP because it is a protected industry employing approximately 200 blind and legally blind workers and paying an average wage of $4.57 an hour. The jobs at MIB are similar to a number of jobs in the Mississippi economy. This similarity enhances the acceptability by local industry of the ISP model developed for MIB.

Training Units Developed for Phase 1

After thorough consultation with MIB management, meetings with the employee advisory committee, and a job analyses of each position in the plant, five ISP training units were developed. Each unit teaches the new MIB employee what he or she will need to know if they are to be productive employees. The units in order of their presentation to the new employee are Orientation to MIB, Fundamentals of Employment, Product/Process Orientation, Company Rules, and Basic Sewing. A User's Guide was developed for the trainer to teach each unit to the new blind or legally blind employee.

Format of the Phase 1 Training Units

Each unit is divided into the following components: (1) title, (2) instructions, (3) purpose of the lesson, (4) objectives, (5) directions, (6) the text of the lesson, and (7) self-assessment. The self-assessments are spaced throughout the text of the lessons to allow the trainee and trainer to monitor the trainee's progress. The lessons are based on a single concept or tasks or closely related sets of concepts or tasks. The lessons are individually bound for study convenience.

The activities presented in each module provide an opportunity for the trainee to obtain "entry-level" knowledge, skills, and attitudes. The units require about 200 hours to complete. After successfully completing a lesson, the trainee should be able to apply what is learned on the job. The periodic self-assessments are provided to allow the trainee to determine whether he or she has mastered the material. Once one unit has been mastered, the trainee proceeds to the next unit. A total of three days is required to complete the program.

The ISP model, if it is found to be an effective and efficient way to increase the productivity of blind and severely visually impaired workers, may be used by the field to increase the employability of blind and severely visually impaired persons in the competitive labor market. State and private agencies can work with the state agency responsible for developing the ISP for local industry. By assisting in the develop-

ment of ISPs for local industry, the state or private agency can assist industry in meeting the affirmative action goals and complying with Section 504 regulations as well as increasing the employment prospects for blind and severely visually impaired persons.

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REHABILITATION RESEARCH PAST AND FUTURE

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In discussing the evolution of rehabilitation research, I want to cover three aspects of this discipline--rehabilitation research technique, content, and impact.

The discussion of rehabilitation research techniques must begin with a definition of terminology. In a recent article, William Graves (1983) quoted Goldberg by stating that, "rehabilitation research is a discipline concerned with the human problem of adaptation to disability and handicap." It is concerned less with etiology and treatment of disease of the visual system than it is with the functioning of blind and visually impaired people. Emphasis is placed upon how the disability affects the individual's physical, psychological, and vocational functioning.

This description adequately circumscribes the scope of activities contained within the sphere of rehabilitation research. The technique used in rehabilitation research to address the topics of human adaptation to disability and the effects of the disability upon individual functioning, however, can only be ascertained by an examination of the activities performed over the past two decades under the general classification of rehabilitation research. According to the American Heritage Dictionary, research is scholarly or scientific investigation or inquiry. Recently, some researchers have wanted to super impose experimental methodology onto the definition in order to enhance the quality of research being conducted--a laudable objective--and to attempt to legitimize disciplines operating at the fringe of science. This definition would be too narrow. We must insist upon rigor in experimental design when this technique is appropriately applied, but we must avoid the repression of scholarship and scientific investigation.

I have encountered a debate which has been waged in graduate schools and among scientists over the definition of science. Is science a body of knowledge, a methodolgy, or an attitude? The answer is a resounding "yes"; it is all three. It is often a methodology. In experimental research and clinical evaluation, scientific methodology is essential. Science is also a body of knowledge. One of the primary responsibilities of research, one which is contained in the dictionary definition, is the conduct of investigation in order to obtain new facts and knowledge. Thus, our rehabilitation research should have, as one objective, the addition of new facts to the corpus of

scientific knowledge concerning visual impairment or the people affected by it.

Science is also an attitude. In my personal opinion, the scientific attitude may be the most important of the three parts of science. The appropriate scientific attitude should be maintained throughout the design and conduct of any investigation; during the analysis of information and data once they have been collected, in the process of drawing conclusions and generalizing findings to other situations, in the dissemination of results, and in the reading of other investigators' reports. Maintaining the scientific attitude demands objectivity, caution, and self criticism. It requires the avoidance of advocacy whether of philosphy, product or population, if one's own findings are to have credibility.

Thus rehabilitation research should be: innovative rehabilitation related activities, governed by a scientific attitude, directed toward the pursuit of knowledge.

Examination of scientific activities which have flown the flag of rehabilitation research shows a vast array of endeavors and investigation techniques--including rigorous experimentation, product development, program evaluation, clinical trials, literature and demographic surveys, demonstrations, and systematic observation. Several of these traditionally are not classified as research--namely: development, evaluation, demonstration, and observation. However, if these activities are designed and conducted using a scientific attitude and process, then they legitimately meet the dictionary definition of research--scholarly or scientific investigation.

There are two reasons why the term research is applied to so many activities when other more descriptive terms would communicate better. First, the term research carries with it the mystique of science and an image of respect more than any of the alternative choices. Second, funds for the conduct of research, as limited as they may be, continue to be far more plentiful than for any other innovative activity which may even be viewed by funding agencies as self-indulgent mental gymnastics. The National Science Foundation, for instance, is constantly being reminded by several powerful Senators to safeguard the national treasury against misappropriation of the Federal funds for the pursuit of frivolous information. Too often, this "frivolous" information

could provide other scientists later with the basis of developing products or techniques which would be beneficial to numerous disabled persons.

I have devoted a significant amount of time and space to the topic of rehabilitation research techniques for two reasons. First, I want to stress that there is a vast array of legitimate scientific techniques which can be employed for the purpose of studying the effects of, and the adaptation to, blindness and visual impairment. Experimentation, demonstration, evaluation, clinical trials (the testing of innovative treatment techniques or devices), literature and demographic surveys, product development, and systematic observation, are all potentially valuable scientific techniques which should be within the purview of the Federally funded rehabilitation research and training centers, rehabilitation engineering centers, and individual research, demonstration, and evaluation projects.

Second, I wanted to lay the foundation for a brief discussion of public policy considerations which continue to surface in Washington concerning disability related research programs and activities.

The ambiguity caused by the term rehabilitation research is mild compared to that produced by the unfortunate selection of language contained in the 1978 amendments to the Rehabilitation Act of 1973. Now, codified in Federal legislation and regulations is the term "handicapped research." This misplaced adjective is institutionalized in the naming of the primary research agency in our field, the National Institute of Handicapped Research (NIHR) and the main legislatively mandated, inter-governmental body with coordination responsibility for disability related research, the Interagency Committee on Handicapped Research. If we are not careful, if we are not successful in changing the names of these entities, we may find that the term becomes a self fulfilling prophesy. Research programs initiated and supported by the government may become handicapped by insufficient attention and coordination. Every director and acting director of NIHR since its inception has expressed embarrassment over the grammatically incorrect name. Each, serving as the chairperson of the Interagency Committee, has listened to expressions of dissatisfaction raised by other governmental representatives. An inordinate amount of time is still being spent in interagency committee meetings on attempts to define the scope and boundaries of "handicapped research."

Handicapped research is, of course, more than rehabilitation research as it must encompass educational, clinical and basic research issues not directly concerned with rehabilitation. Nevertheless, the term "rehabilitation research" currently is being widely touted as the likely substitute for that of "handicapped research." If such a change is made, we who come primarily from rehabilitation backgrounds must embrace flexiblity and accept a wider definition within this field so that we can avoid continued semantic squabbles. Without resolution of this pervasive public policy problem, there will be inadequate attention paid to needed planning and coordination, and there will be insufficent legislative advocacy for program and appropriation expansion.

I am optimistic that public policy formulation processes will eventually lead to stronger statements supporting the need for expanded disability related scientific research, development, demonstration and evaluation activites. Concerned citizens can support such policy formulation by informing their Congressmen, NIHR, the Interagency Committee on Handicapped Research, or the National Council on the Handicapped.

Returning to the specific topic of rehabilitation research techniques, it should be pointed out that the past two decades have witnessed research which varied greatly in quality. One factor which has significantly affected the quality relates to the participation of blind and visually impaired individuals in the design and conduct of the research projects. This statement is especially valid in my field of sensory aid technology design and evaluation, but the problem has also been manifested in other research fields as well. In the sensory aids field, all too frequently, a scientist or inventor decides to apply his/her specialized knowledge and skill to a topic considered to be a significant problem area for blind people when in fact the resulting product is unneeded or the approach is inappropriate. Social and psychological research conducted by people with misunderstanding of blindness and based upon false assumptions regarding abilities and needs has resulted in grossly invalid conclusions. If these well-meaning researchers had bothered to include blind and visually impaired individuals as associates, advisors, or assistants, most of the erroneous conclusions and inappropriate products would have been avoided.

We can be optimistic about the future of rehabilitation research. The remainder of this century should have an increasing proportion of projects controlled and directed by truly scientific minds and attitudes. Concommitantly, we can anticipate higher quality of relevant research, results, and products as blind and visually impaired individuals are more universally accepted as regular members of research teams.

Reference to the relative appropriateness of research approaches and products brings this discussion to the second major topic, the content of rehabilitation research.

In the area of basic scientific research relating to blindness, we had, 10 to 15 years ago, great interest in the investigation of sensory substitution and sensory restoration with the goal of either replacing or repairing impaired sensory systems through engineering or medical intervention. These scientific endeavors have continued but at a very low level for the past decade. Exciting advances in several scientific disciplines will undoubtedly lead to a resurgence in these activities within the next five years. Computer vision for the control of robots is progressing rapidly and should provide scientists interested in sensory substitution new inspiration. Investigations into the regeneration of damaged nerves will provide new theoretical basis for sensory regeneration investigations. In addition, exciting preliminary work with the implantation of solid-state neural networks will provide both scientific groups with new possibilities. Scientists are developing techniques for controlled growth of nerve tissue networks on solid-state chips to be implanted into anatomical systems to bypass damanged nerve connections.

The dreams of today's basic research scientist may be the reality of the future. That future, however, is sufficiently remote to require us to look to the researchers who have their feet on the ground rather than their heads in the clouds for answers for the immediate future. Rehabilitation research will continue to address the issues of adapting to our societal and environmental needs. Our society is changing, however, and the rehabilitation research discipline is maturing. Thus, we can expect significant changes in project content in the coming years.

Employment, or vocational rehabilitation, will continue to be a high priority topic for rehabilitation research. The rapidly changing labor

market in our country demands immediate responsiveness from our rehabilitation research community. We are rapidly moving from an industrial to an information society (Toffler, 1980, and Naisbitt, 1982). We are changing from an economy based upon manufacturing to an economy based upon the handling of information. Statistics taken from the best-selling book Megatrends by John Naisbitt (1982) are very revealing and provocative for rehabiltation professionals. Some highlights are cited here.

In 1950, only 17% of the nation's labor-force worked primarily with information, but now over 60% do. Most American workers are involved today in the creation, processing and/or distribution of information. David Birch of MIT was quoted by Naisbitt as reporting that only 13% of the nation's workers are now engaged in manufacturing operations. During a seven year period ending in 1976, nine million new workers were added to the nation's work-force--none were added to the Fortune 1,000 largest industrial concerns. In the 1970's, 19 million new jobs were created in this country; only five percent were in direct manufacturing, and only 11% overall in activities relating to the manufacturing and production of goods, leaving nearly 90% in the non-goods producing sector. David Birch summarized this trend (Naisbitt, 1982) by saying that, "We are working ourselves out of the manufacturing business and into the thinking business."

Many economists believe that the high unemployment areas of the last three years are directly attributable to these labor-force demands rather than to the international balance of trade, interest rates, or other economic factors. This opinion has support when noting that there remains an unmet need for trained personnel to work in information jobs and a decreased demand for workers in manufacturing.

The next trend to consider relates to the fact that the information being created, processed, and distributed is becoming more and more electronically based. Estimates regarding the rate of this change differ markedly; Naisbitt quotes one forecaster who says that 75% of the nation's jobs by 1985 will involve computers in some way, but others generally are more conservative holding that at least 60% of the jobs in 1990 will be electronically based. In either case, Naisbitt appears to be correct when he states that, soon, those who cannot interact with a computer will be at a severe disadvantage in the workplace.

The potential implications of these societal and economic changes upon the lives of blind and visually impaired people are exciting to consider. With appropriate sensory aids which provide synthetic speech, braille, or large-character displays, blind and visually impaired people have full equality in the access and manipulation of electronic information--information essential for educational, employment, and recreational pursuits in the emerging information society. Blind and visually impaired people can have a level of equality not enjoyed at any time in history since civilization abandoned the oral tradition for the benefits of literacy and written communication. The future employment picture for blind and visually impaired people is very bright indeed.

A few months ago, a rehabilitation professional wrote, in response to similar remarks by me, that we should be very cautious in directing blind and visually impaired people into vocations demanding interaction with computer displays because we have such a high percentage of multi-handicapped blind people who could not function in such a sphere; and besides, this professional continued, there certainly could be maintained enough assembly type manufacturing jobs which would be more appropriate for this population. I recognized that this individual was projecting self felt intimidation by computer equipment, an extremely common malady experienced by American adults. The views of this one rehabilitation professional are shared by countless others because the intimidation is widespread and the reluctance to accept change is common. The arguments, however, are invalid. First, it does not require high intelligence to interact with many computer programs. In the future, all computer programs will be able to carefully lead anyone step by step through a set of tasks by providing detailed auditory instructions. Second, data are becoming public daily showing that microcomputers can serve as educational, training, and employment instruments for severely, multi-handicapped people with motor, mental, and sensory impairments. The computer display--whether visual, auditory, or tactile--can serve as a compelling and motivating reinforcement for the shaping and molding of appropriate responses, language, and behavior. And third, we can and should retain work-activity and sheltered employment centers for some people--including appropriate multi-handicapped people--who do not want to, or cannot, participate in competitive

employemnt. But why should these work stations be anchored to the past? In the near future, it will be economically unsound to attempt to operate any business, sheltered or not, based upon hand labor when it must compete with automation. Electronically based work stations will far out-number other job activities from this day forward. I would not deliberately choose to encourage my child to prepare for a career that is destined to require fewer and fewer workers in the future, and she is able-bodied. So how could I do so for a person from a population which traditionally experiences employment discrimination? There is a place for multi-handicapped people in the information society economy; it will be our responsibility to define it and insure that it is implemented.

Thus, our employment related rehabilitation research needs a new focus--namely, the identification of the problems and the solutions for blind and visually impaired people working within the information sector. The research activity must include an effort to investigate aspects of this rapidly evolving economy which can be harnessed for sheltered employment. The monitoring of simple computer aided manufacturing tasks is one strong candidate which should be systematically explored.

A somewhat related topic concerns the timelines of rehabilitation research to be conducted. It can be anticipated that immediate attention will first be focused on issues from today's employment environment--such as providing techniques to access today's job market by providing adaptations to today's office and industrial equipment. However, time after time, we have seen in this field the recurring problem arising from the fact that there is an accelerating rate of change within the employment environment--tasks change, the life span for business technology is shorter and shorter; and so we have witnessed the obsolescence of adaptive work equipment and of training programs often at the time of their introduction or soon thereafter. We need to be at the fore-front of change, not lagging several years behind. We cannot afford to be only participatory, but we must be anticipatory. Our rehabilitation researchers and other professionals must work closely with economists and labor market trend forecasters. What we need to hear from our rehabilitation researchers tomorrow is what are the labor market needs of the day after tomorrow. What skills and what technology will be needed for the blind and

visually impaired population? Which employment tasks will be performed in offices, in institutions, in industry, and from homes? What adaptations can be made to tasks and to future work sites to accommodate multi-handicapped blind people? What training methods will maximize the capabilities of all of our sub-groups? With this research agenda, the rehabilitation research activities relating to employment will be meeting the challanges of rehabilitation professionals and the blind and visually impaired clients.

In the area of orientation and mobility research, past research has emphasized the development of techniques and devices designed to promote improved safe travel. Such research should and will continue, but there will be in addition a much higher emphasis placed on topics which have received only limited attention, and even less funding support in the past. These topics relate specifically to needed systematic study and analysis of the characteristics and abilities of individual blind and visually impaired people who demonstrate extraordinarily good travel skills. In the past, we have devoted the majority of our research efforts in all areas of investigation to the study and analysis of differences, limitations, and disabilities. We should begin to study in more detail the abilities and capacities of blind and visually impaired people in all areas of human life. The area of orientation and mobility is one demanding rigorous investigation.

We all know that some blind people appear to have inherently excellent travel ability. We need to examine the cognitive processes used in their orientation and mobility activities. We need to identify the elements in their spacial representation of various environments and routes traversed. The extent to which echo localization can be use to detect and even describe one's environment must be studied. Most importantly, we must determine how to train others in the acquisition of these capabilities. How can we provide the infant, the child, and the adult the stimulation necessary to facilitate the process of developing these skills? We do not now have the answers to these questions, but it is time we placed high priority status on research designed to investigate these topics.

To discuss possible changes in low vision research is a change in itself. There is virtually no research dedicated specifically to the needs of people with low vision until the late 1960's. Recently, an interagency committee on

low vision research comprised of representatives of all of the major research funding sources in Washington agreed that there still are not an adequate number of quality research proposals relating to low vision to provide the feeling that this population is receiving sufficient attention from the research community. Again, there is need for research related to the abilities of different sub-groups of partially sighted people, and we need to study in much greater detail techniques to maximize the use of residual vision. We are beginning to see quality low vision research; the change in the future should be in the quantity of these efforts.

Other special sub-populations also require additional research attention in the remainder of this century. Specialized needs of older people with visual impairment have yet to be adequately addressed by any research institution or funding agency. The needs of deaf-blind people must be more thoroughly examined seperately from those of either blind or deaf populations. And, again, the special needs of multi-handicapped blind people require careful analysis and attention.

Finially, in the area of rehabilitation research content, greater emphasis must be placed on the economics of disability in general, blindness and visual impairment specifically. Attempts to justify new programs, new sensory aids, new research, and new legislation, have all met with objections because we do not have adequate research data to show the economic benefits of the proposals. We cannot adequately substantiate our claims regarding the economics of the disability or the expected effects of the intervening programs and equipment that are being recommended. We require the full-time participation of expert economists. It will be possible to obtain the assistance of such experts, but it will require the initiation of rehabilitation researchers willing to undertake and help underwrite these studies if we are to obtain the data needed for planning and for advocacy.

The third and last topic to be discussed relates to the impact of rehabilitation research. There is, unfortunately, little to say on this topic. The impact of past research has been intolerably small. Some will say that this has been so because the research was too esoteric or inappropriate. Not necessarily so. We have not done as good a job in disseminating information from research as we should have, but we have been even more at fault for not

assimilating the results that we do have into our programs. Change is the hobgoblin of rigid minds. Change for change sake is not necessarily wise either; but change in order to eliminate weaknesses, or to try to establish a model demonstration, is wisdom at work. Failure to change, or failure to look for funds to permit implementation of change in the presence of information which calls for it, is unforgivable. I may be making a plea rather than a prediction, but I believe that our professional field and our professional organization are more willing to seek new solutions to old problems now than in the past.

Professionals in the blindness field should look for the rehabilitation research results which can improve the quality of life for their clients, students, or friends, and assimilate them into their programs. By doing so, we will improve the impact of this research and insure that the future of rehabilitation research is richer than its already impressive past.

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